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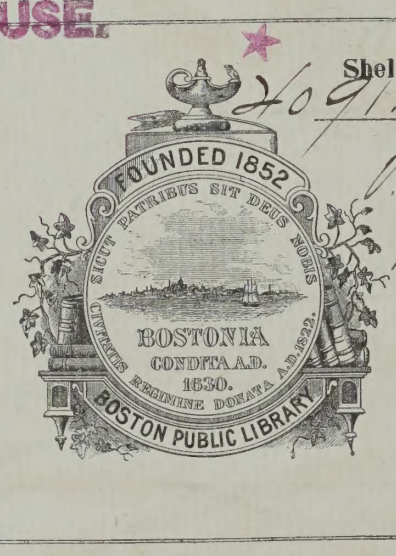

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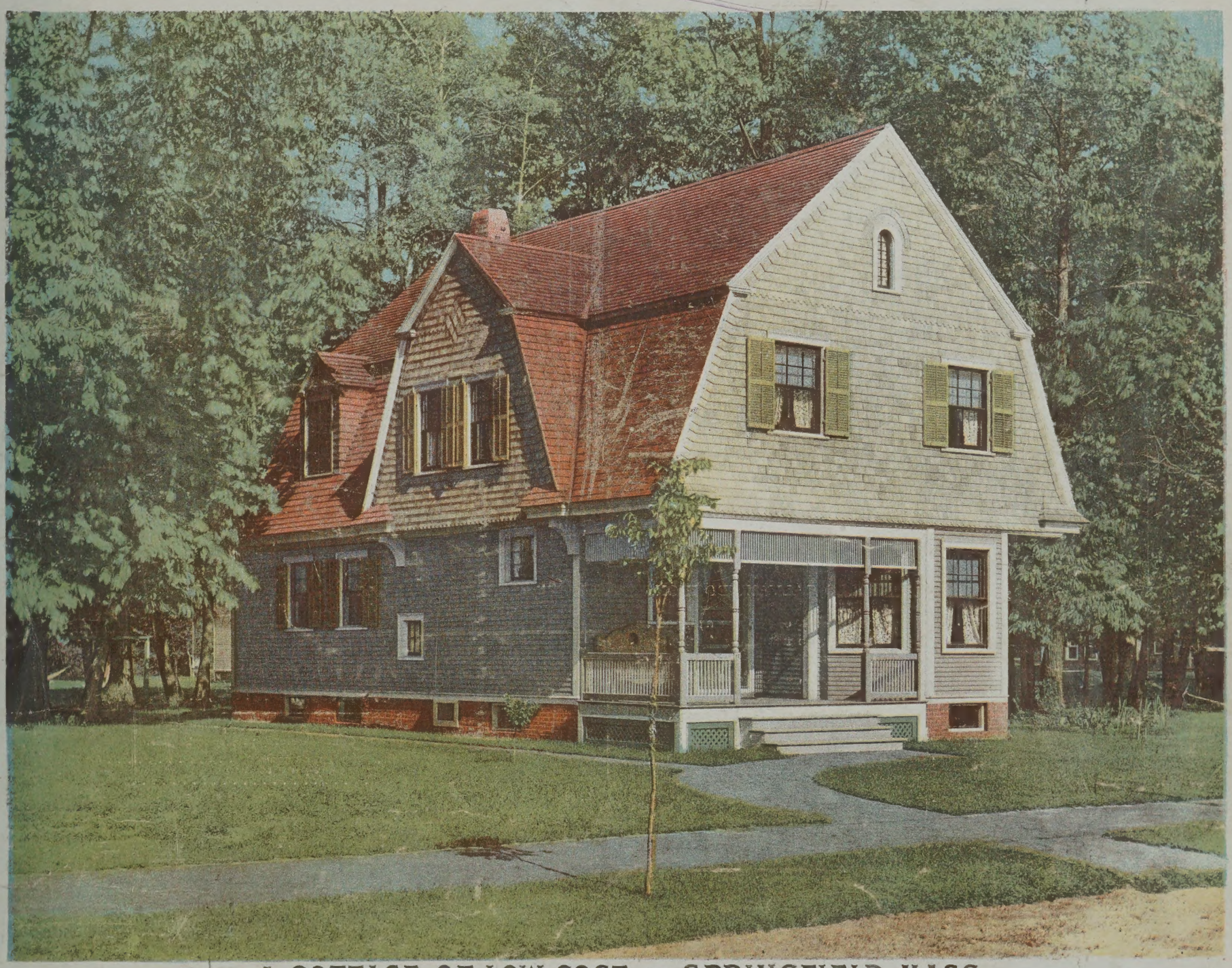

A COTTAGE OF LOW COST AT SPRINGFIELD, MASS.

Nº 129. JULY 1896.

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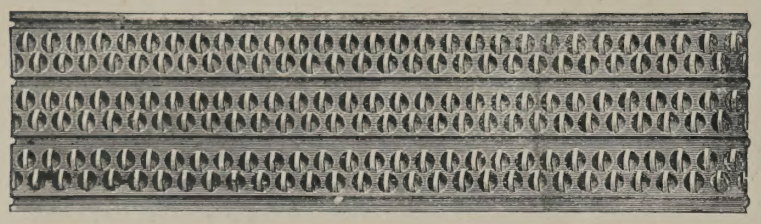

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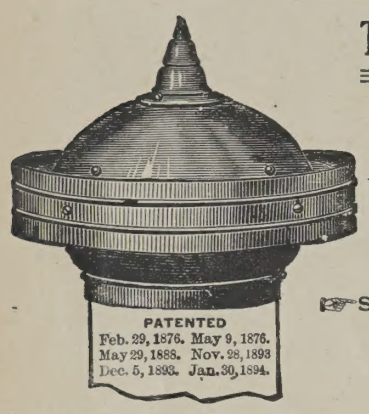

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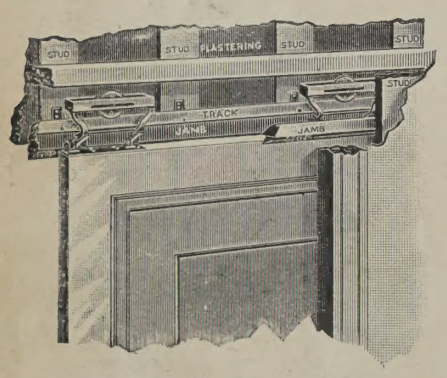

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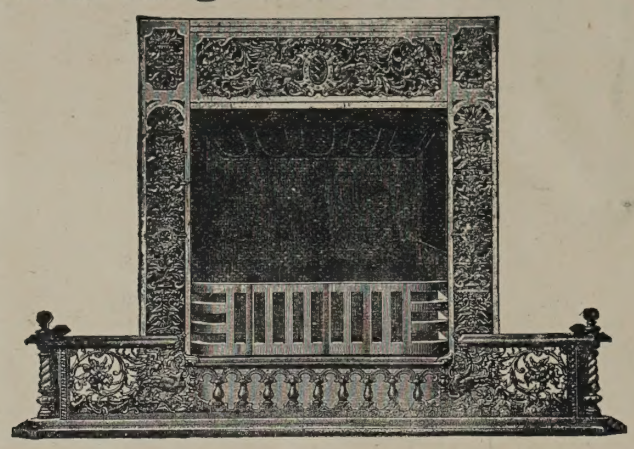

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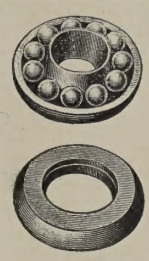

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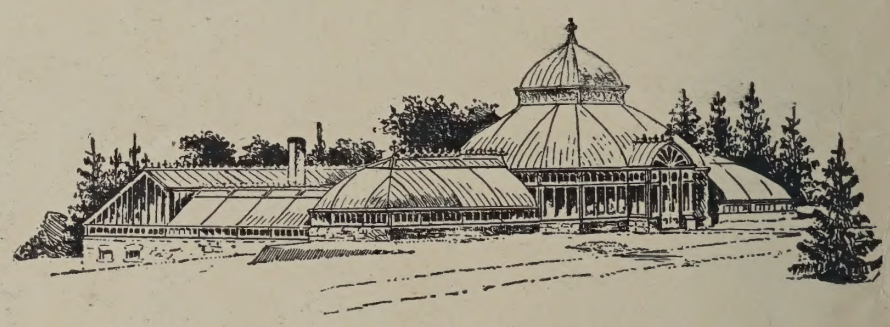

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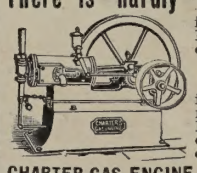

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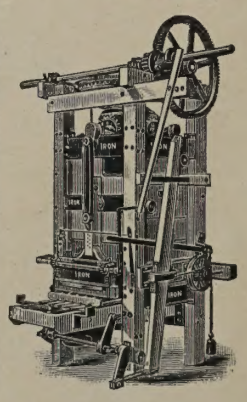

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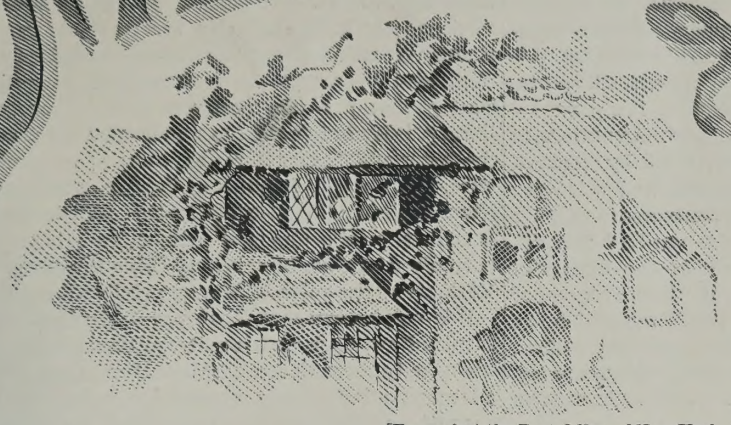

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Scientific American.

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THE FIFTIETH ANNIVERSARY OF THE FOUNDATION OF "SCIENTIFIC AMERICAN."

Though it is doubtless well known to the majority of the readers of the BUILDING EDITION of the SCIENTIFIC AMERICAN that the original publication ranks as one of the oldest journals in the United States, they may not be aware that it has now been making its appearance, week by week, without interruption for a period of half a century.

We feel that it is due at once to our readers and to ourselves to make some special commemoration of so interesting an event as the fiftieth anniversary of the foundation of the present firm, and we have decided that this shall take the form of a profusely illustrated special number, which will be issued on July 25 of this year.

It has been the aim of the SCIENTIFIC AMERICAN to keep the public faithfully informed, week by week, of the world's current progress in the arts and sciences; and it is our intention to devote the anniversary number to a review of this progress during the past half century.

One of the most interesting features of the issue will be the publication of a prize essay on "The Progress of Invention during the past Fifty Years," for which we are offering a premium of two hundred and fifty dollars. A selection of the five next best papers will, moreover, be published in subsequent issues of the SCIENTIFIC AMERICAN SUPPLEMENT.

We take much pleasure in announcing that Judge A. P. Greeley, of the Patent Office, Washington; Professor R. H. Thurston, of Cornell University; and Professor R. S Woodward, of Columbia University, have consented to act as judges. Their names are so well and honorably known in the world of science and art as to need no lengthy introduction to our readers.

Professor R. S. Woodward is the Dean of the School of Pure Science and Professor of Mechanics, Columbia University. His voluminous contributions to scientific and technical literature during the past twenty years cover a wide range of subjects, and have won for him a high reputation among the scientific societies of both hemispheres.

Professor R. H. Thurston, Director of Sibley College, and Professor of Mechanical Engineering, Cornell University, was for many years Professor of Engineering at the Stevens Institute of Technology. Perhaps he is best known by his many works upon engineering and kindred subjects, which form a valuable part of the technical literature of this country. Judge Arthur P. Greeley, Examiner in Chief at the Patent Office, Washington, who is a lawyer by profession, has won his present high position in various competitive examinations, in which he has gained successively the position of third, second, first assistant and prin ipal examiner.

We have also made arrangements to secure a vote upon the question as to what invention introduced within the past fifty years has conferred the greatest benefit upon mankind. We shall be glad if the readers of the BUILDING EDITION will send in their vote at an early date. The result in any case will be of special interest, and particularly so if, as we hope, the majority of our large body of readers and subscribers will express their opinion.

We would call the attention of our readers and advertisers to the announcement, published in our advertising columns, of the Fiftieth Anniversary number. To advertisers this issue affords an exceptional opportunity, as the immense guaranteed circulation will be both national and international, and a large increase of trade must necessarily accrue to those who engage space in this most interesting number.

A REPRESENTATIVE PUBLIC LIBRARY FOR NEW YORK CITY.

The City of New York is just now presented with an opportunity for adding a great municipal building to the list of those which she already possesses. In saying that the size and number of such buildings are in no sense adequate to the city's needs, or justly representative of its size and wealth, we are simply repeating a trite fact, almost too well known to call for repetition. That it is so is not chargeable to the neglect of those who have had the interests of New York in their care; it is the result of the extraordinarily rapid growth which has taken place in recent years. There is no doubt that, when the dimensions of the City Hall, the Post Office, and the Custom House were determined upon, it was considered that ample provision had been made for the growth of the city for some generations to come. But although there is no blame attachable to the authorities who determined on the dimensions and character of the existing structures, it is certainly imperative that the present municipal board should profit by past experience, and make a most liberal allowance for future development when they determine on the erection of any future public building. Greater New York, with the added population of Jersey City, is easily the second city in size in the world; and there are good reasons to believe that before the next century has passed the greatest urban population the world over will be found gathered around the mouth of the Hudson River. It would be a far-seeing policy to plan and build with this probability in view. We can scarcely build too generously in the matter of accommodation, or too splendidly in the matter of architectural dignity and display, for the numbers, the wealth, and the artistic taste of the New York of the Twentieth Century.

But to leave the general question, and get down to a particular case. New York as it stands to-day is without a great representative city library, and in this respect, considering its size and importance, it stands alone among the great cities of the world. London has its library at the British Museum, Paris its National Library, and Berlin the Royal Library; and in each case, though there are numerous smaller institutions devoted to the same end, these above-named are the great central collections, which, by their size and vast accumulation of literary treasure, adequately meet the needs of the whole city, and represent its metropolitan importance. In stating that this city possesses no great central public library, it is not intended to undervalue the excellence of the Astor and Lenox libraries, those of the various societies, the Cooper Institute collection, and many other libraries devoted to special interests. These are all doing excellent work, and the extent to which they are patronized shows how keenly alive the people of New York are to the value of library privileges.

It is well known that Governor Tilden had intended to furnish New York with a metropolitan library, and that it was only through some technical errors in his will that a large sum failed to be secured for its foundation. This bequest, or the remains of it that were rescued by one of the heirs, and the interests of the Astor and Lenox libraries, have been consolidated into one, for the purpose of erecting a central library, and the movement has recently taken an important step forward in the signing by the Governor of a bill appropriating a magnificent site for the erection of the building. It would have been difficult to find a more commanding and central position than that now occupied by the old reservoir, which is situated between Bryant Park and Fifth Avenue. The high elevation of the ground, which made it desirable for engineering purposes, is equally valuable from the standpoint of the architect; and being located on Forty-second Street, it will be centrally placed as regards transportation facilities to and from the remoter parts of the city.

In dealing with the question of the size and adornment of the proposed building, it is scarcely possible to be too generous. The Congressional Library at Washington shows that, where they are given a free hand, our American architects can equal the best work of European designers; and New York, as the commercial metropolis of America, should see to it that the new structure is worthy of her rank, and such as will be adequate to her needs for many generations to come.

A MODERN DWELLING.

We present on page 7 a modern dwelling, which has been recently erected for Mr. Tunis S. Dutcher, at Nyack-on-Hudson, New York. The illustrations show a unique design for a modern dwelling, and the plans present an excellent interior arrangement. Underpinning is built of brick, laid up in red mortar. The exterior framework above is covered with clapboards and shingles, and then painted Colonial yellow, with white trimmings. Roof is shingled, and finished natural. Dimensions: Front, 26 ft. 6 in; side, 32 ft. 6 in., exclusive of porches. Height of ceilings: Cellar, 7 f.; first story, 9 ft. 6 in.; second, 8 ft. 6 in.; third, 8 ft. The first story is trimmed with cypress, and is finished natural. The hall presents an inviting appearance upon entering, *via* the arched and latticed effect between hall and parlor; the former contains an ornamental staircase, with turned newel posts, balusters, and rails. Parlor is spacious and well lighted. Dining-room is fitted up with an open fireplace, trimmed with tiled hearth and facings, and a hardwood mantel. Kitchen is wainscoted, and fitted up complete. Second floor is trimmed with North Carolina pine, and it contains library at second landing on staircase, four bedrooms, and bathroom; the latter being wainscoted, and furnished with the usual fixtures. Third floor contains one bedroom in tower, and ample storage; other rooms can be finished if desired. Cemented cellar contains furnace, laundry, and other necessary apartments. Estimated cost, $3,000. Mr. James B. Simonson, architect, Nyack, New York.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

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Messrs. Munn & Co., in connection with the publication of the **Scientific American,** continue to examine improvements and to act as Solicitors of Patents for Inventors.

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PRESBYTERIAN CHAPEL AT OVERBROOK, PA.

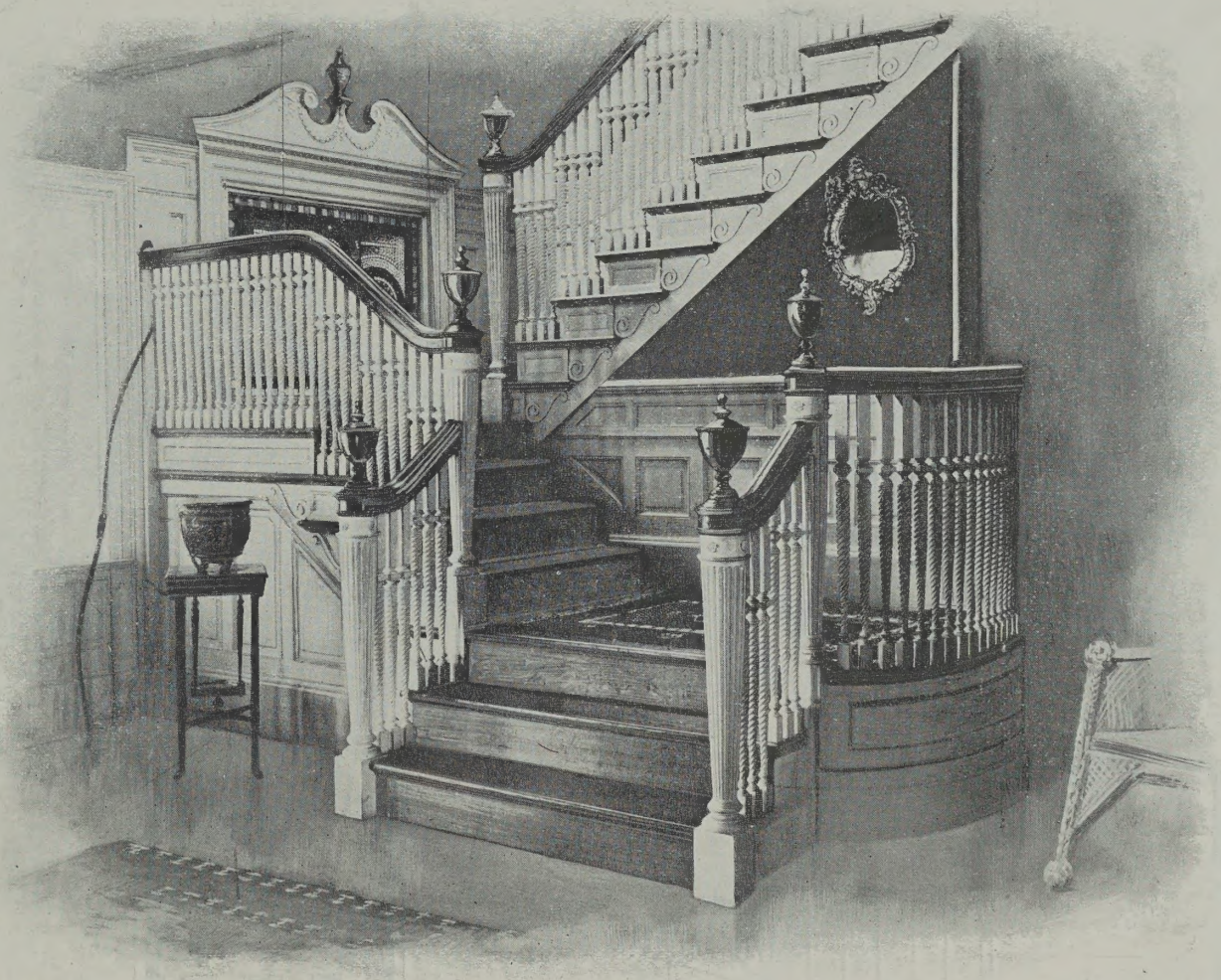
On page 8 we illustrate the Presbyterian Chapel, at Overbrook, Pa., Rev. Charles R. Erdman, Pastor. The design is simply yet picturesquely treated in the English Gothic style. Structure of local stone, gray in color, laid with joints well broken. The severity of the main gable is relieved by the hipped roofs of the transepts and apse and the porch gables, as well as the octagonal ventilator with its rich detail. The porte-cochère, 14 ft. in width, and the entrance porch, are interesting features. Exterior dimensions of main structure: Width, 34 ft.; depth, 68 ft. 3 in. Height: Cellar, 7 ft.; ground floor, 23 ft. to under side of ridge, 7 ft. above for air space. Roof is covered with gray slate; trimming color, dark brown and deep red. The floor plan shows four entrances to auditorium, two being direct. Walls are all in rough, pebble dash plaster, tinted terra-cotta; there is a buff brick dado to sill line. Trusses are of yellow pine, stained deep brown and circular in form; six incandescent electric lights spaced on each. The chancel arch is of plaster, decorated; the main window, of pleasing detail, is glazed with stained glass, as are all the side windows (leaded) and the east window, circular in form, the predominating colors being light green, pink, soft red and terra-cotta. Roof boarding, yellow pine, with air openings. Seats having high backs are movable in order that they may be used for Sunday school purposes. Seating capacity is 250, inclusive of transepts. Chapel is heated by hot air, and cost $10,000. Addison Hutton, Esq., architect, 400 Chestnut St., Philadelphia, Pa.

Our engraving was made direct from a photograph of the building, taken specially for the SCIENTIFIC AMERICAN.

A COTTAGE IN THE SUBURBS OF WASHINGTON, D. C.

We illustrate on page 7 the residence of A. B. Brown, Esq., at Chevy Chase, Md., a suburb of Washington, D. C. The design is treated in the Colonial style, with plain hipped roof, slightly relieved by eyebrow window; the corner porch, with its grouping of Tuscan columns on boxed bases, breaks the rather severe lines of the building. Underpinning of brick, exterior framework above being sheathed, papered, clapboarded, and tinted slightly off the white; trimming color, white; blinds, dark green. Dimensions: Front, 34 ft.; side, 27 ft. 6 in., exclusive of porch projections. Heights: Cellar, 7 ft.; first floor, 9 ft. 6 in.; second, 9 ft.: attic unfinished. The front entrance door is five-paneled, and opens on reception hall, having fireplace of red brick, with arched opening, under the staircase, in oak, with square, ornamental newel and turned balusters; side spindle balusters to ceiling, forming screen, also seat; wide opening to parlor, finished in cream and having angle fireplace of mottled brick; similar opening to dining-room, also with angle fireplace, balanced by china closet, and angle opening to passage and hall. Butler's pantry contains planished sink and dressers. Kitchen with usual fixtures complete. Second floor is divided into three chambers, servant's and bath room, with usual fixtures of approved make. Cellar, cemented, contains laundry, heating apparatus, fuel storage, etc. L. D. Meline, Esq., architect, Chevy Chase, Md.

Our engraving was made direct from a photograph of the building, taken specially for the SCIENTIFIC AMERICAN.



INTERIOR OF RESIDENCE AT YONKERS, N. Y.—See pages 13 and 16.

MAUSOLEUMS.

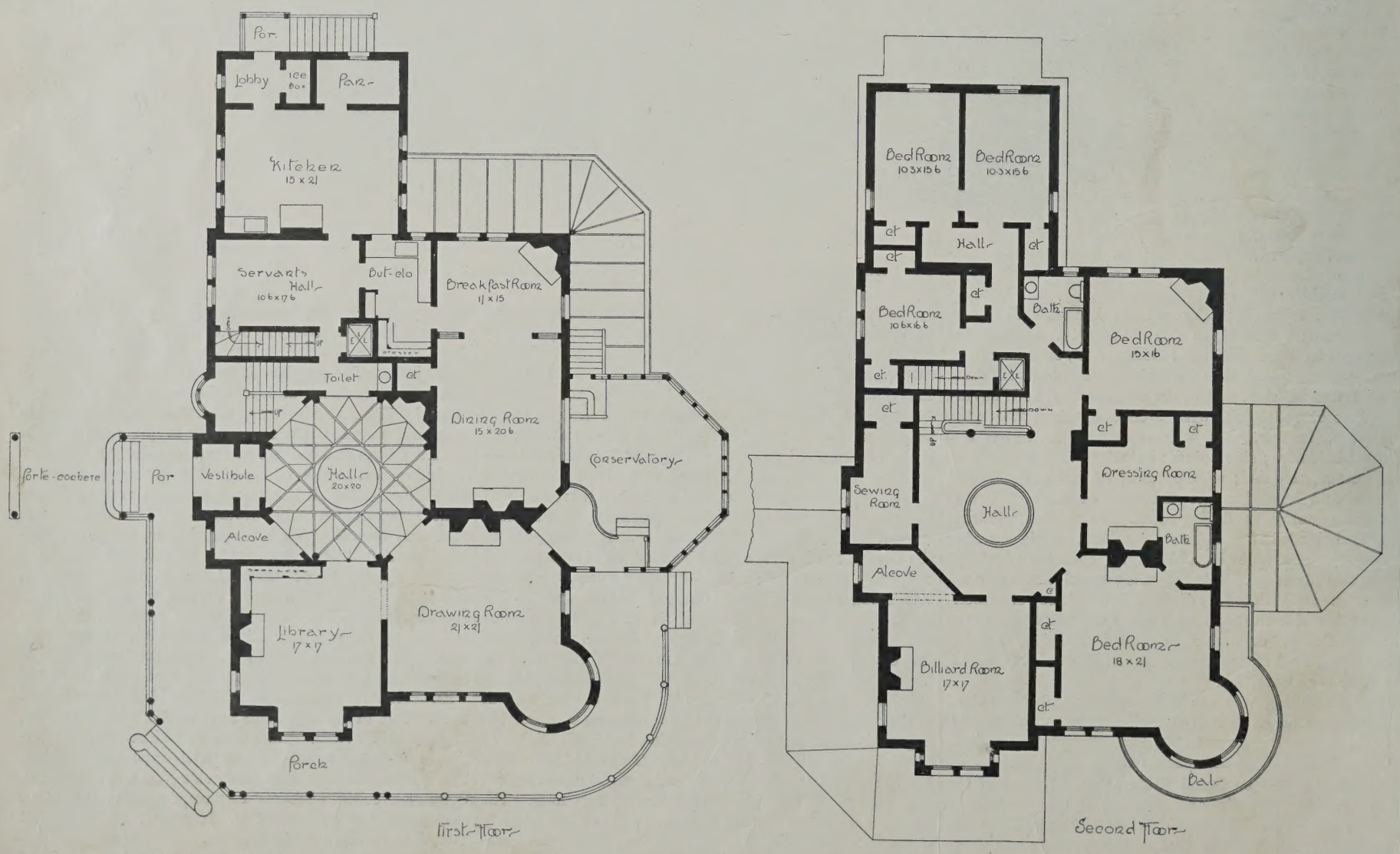
On page 9 will be found illustrations of some of the most modern, artistic and substantial mausoleums of classic design at Woodlawn Cemetery, New York. It may be of interest to note that cemetery, literally a sleeping-place, was the name applied by the early Christians to the places set apart for the burial of their dead, and were generally unconnected with churches, because the practice of interment in churchyards was unknown in the first centuries of the Christian era. Our motive in devoting space to the illustration of mortuary is to show the rapid progress that has been made in monumental architecture the past few years in this country. It is a fact that in no place in the world can be found anything to equal the expense attached to the erection of these mausoleums, or the artistic rendition of the classic orders of architecture as presented herewith in the illustration. The mausoleum as a monument to the memory of the dead is steadily growing in favor, and while comparatively few people are able to afford anything approaching the original Mausoleum, the tomb erected at Halicarnassus to Masolus, King of Caria, by his Queen, Artemisia, about the year 353 B.C., which was noted as one of the seven wonders of the world and was 126 feet long, 100 feet wide at the base, and 140 feet high, yet a handsome, and, in fact, a magnificent, mausoleum can be built at quite a reasonable cost. Designs in monumental work, while it remains a branch of architecture, are quite separate from ordinary house and building work, and requires a special study in proportion, ornament and construction to obtain the best results. A correct idea expressed in stone may be beautiful so long as it is unique, but by its frequent imitations of its original it may destroy the charm of the first, and ultimately inspire feelings contrary to those desired. The first illustration on the page is the family memorial to Col. Torrance, which is unusual and striking in form, and consists of a baldachino, or canopy, of light gray granite, classical in design, and supported by six richly wrought Corinthian columns. It incloses a sarcophagus of polished Peterhead granite, modified from the Scipio Barbatus monument now in the Lateran Museum at Rome. The various courses are in single stones, without vertical joints. This memorial was designed and built by the New England Monument Company, of this city, and, although it was erected fifteen years ago, it seems as fresh and perfect as if erected yesterday. The second illustration presents the mausoleum erected for Mr. Collis P. Huntington. It is designed in the Roman Doric style of architecture, and is constructed of Quincy granite of a most durable quality, the whole presenting a tomb of substantial proportions, and a solidity that is seldom equaled. It is 32 feet long and 18 feet broad. The main walls are of dressed stone, while the colonnaded effect which surrounds the tomb is formed of Doric columns of similar granite, and highly polished. The grand stairway leading from the avenue to the entrance is constructed in a massive manner, the steps being cut out of solid granite, and each flight, of seven or more steps, is in one block, the first block weighing 70 tons. The roof stones are of unusual construction, and consist of five pieces of stone, 32 feet long. The entrance doors are of solid bronze, and very handsomely wrought. The interior walls, ceiling, floor, and catacombs are of pure white Italian marble. There are sixteen catacombs, and they are separated by numerous pilasters running from floor to ceiling. The end wall contains a window with some fine stained glass effects. This mausoleum was designed by John C. Babcock and built by Robert Caterson, both of Woodlawn, New York. The third engraving presents the mausoleum erected for Dr. Lucien Warner, and is one of the most exquisite examples of monumental art in this country. The design is of a classic order, and is taken from suggestions of the Temple of Vesta, at Rome. It is built of red Westerly granite, a very finely shaded stone of pink and gray hues, interlaced with each other. The form is circular in shape, and is built upon a solid stone foundation; above this foundation is a series of steps surrounding the tomb, from the top one of which rise eight massive columns with finely carved caps. These columns support the cornice and roof, which is of solid granite. The gates and doors are of solid bronze. The floor is laid with tiled mosaic; the walls and slabs in front of repositories are of polished Sienna marble, and the ceiling, which is dome shaped, is laid with glass mosaic, executed by the Tiffany Glass and Decorative Company. It was designed by Messrs. R. H. Robertson and A. J. Manning, of 160 Fifth Avenue, New York, and was built by the New England Granite Co., of Hartford, Conn.

(To be continued.)

A RESIDENCE AT TENAFLY, N. J.

We publish herewith, on page 11, the most attractive residence at Tenafly, N. J., which has been erected for Mrs. Hines. The elevations are executed in a most excellent style of architecture, and have many good features both on the exterior and throughout the interior. The underpinning, first story and balustrade at piazza are built of local New Jersey red sandstone, laid up at random in red mortar. The second story is covered with shingles, and stained a mahogany color. The gables are beamed, and filled in with plasterwork. The roof is shingled, and painted red. The trimmings are painted white. Dimensions: Front, 51 ft.; side, 46 ft., not including piazza and porte-cochère. Height of ceilings: Cellar, 7 ft. 6 in.; first story, 10 ft.; second, 9 ft.; third, 8 ft. 6 in. The vestibule and hall are trimmed with antique oak. It has a paneled wainscoting and a ribbed ceiling. The archway is fitted up with a spindle transom. The staircase is a very handsome one, with carved newel posts, and is lighted effectively by a cluster of stained glass windows, shedding a soft and pleasant light over upper and lower halls. The fireplace is built of brick, with hearth and facings of same, and provided with a massive oak mantel. The parlor is treated with China white enamel in an artistic manner. It has an open fireplace, with white enamel tiling, and mantel of exquisite design, and also a window seat at side of same. The library is trimmed with cherry, and it has also a fireplace and bookcases built in complete. The dining-room is trimmed with oak, and furnished with a paneled wainscoting, ceiling beams, and fireplace with carved mantel. The butler's pantry is of unusual size in its dimensions, and is fitted up with bowl, dresser with glass doors, shelves and drawers, in a first-class manner. Kitchen and its apartments are trimmed and wainscoted with whitewood, finished natural, and furnished replete. The second floor is trimmed with similar wood, and is treated with colors. It contains six bedrooms, large closets, and bath. Two of the bedrooms have nooks, with fireplaces, and paneled divans. Bathroom is wainscoted, and furnished with the usual fixtures, with exposed plumbing. Third floor contains four bedrooms and ample storage. Cemented cellar contains furnace, laundry, and other apartments. Mr. Edward S. Hapgood, architect, 141 Trumbull Street, Hartford, Conn.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.



THE "COPPER" HOUSE, CONSTRUCTED BY MR. NILES POULSON.—See page 15.

BOSTON PUBLIC LIBRARY.

FIG.2.—SECTION THROUGH FLOOR AND CEILING AT A.B. FIG. 1.

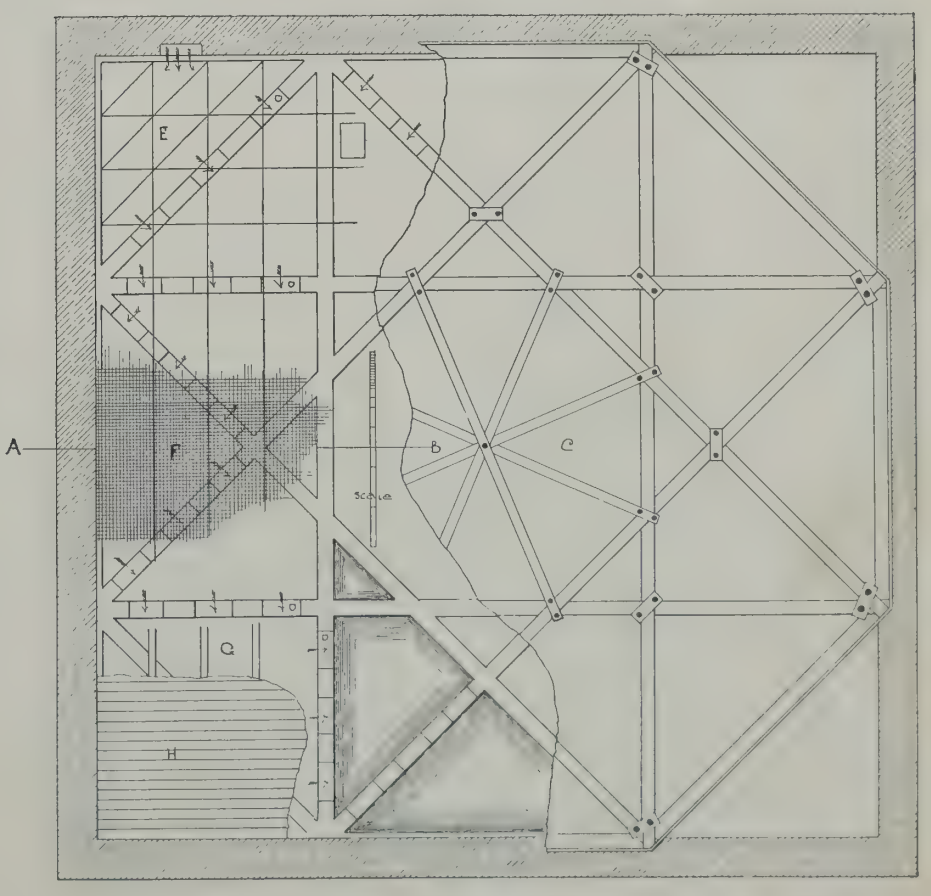
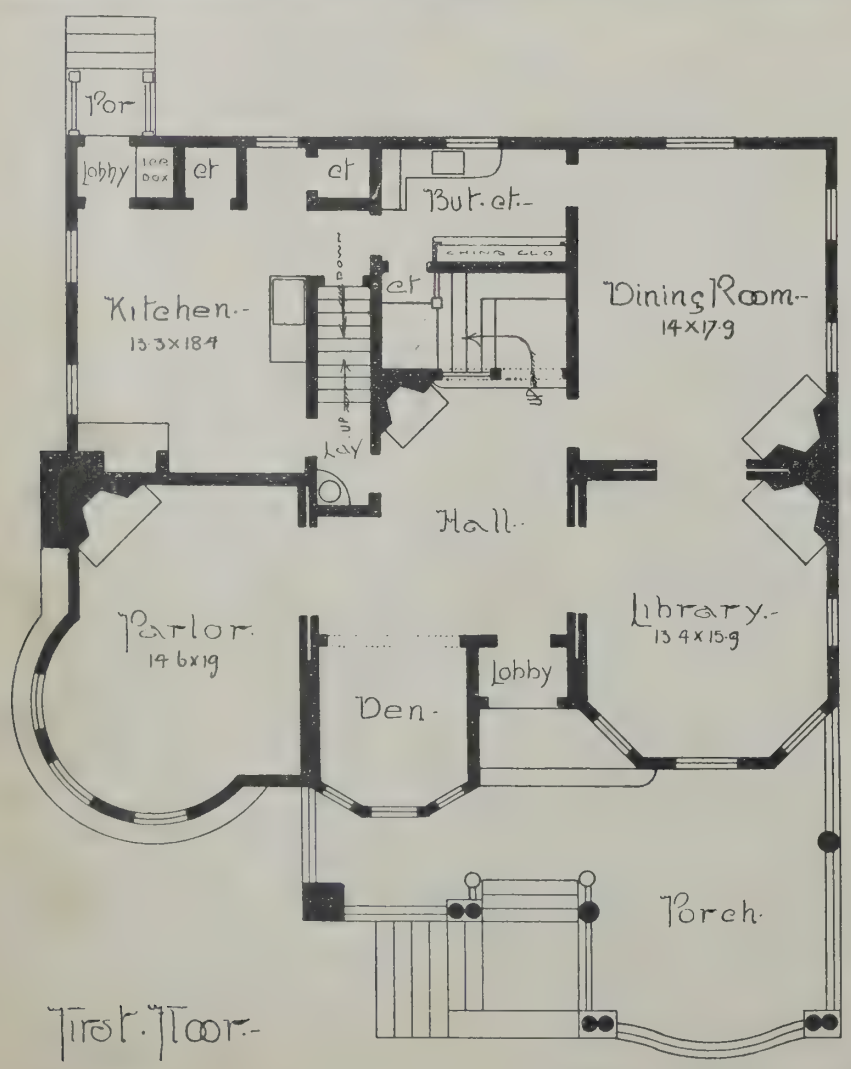
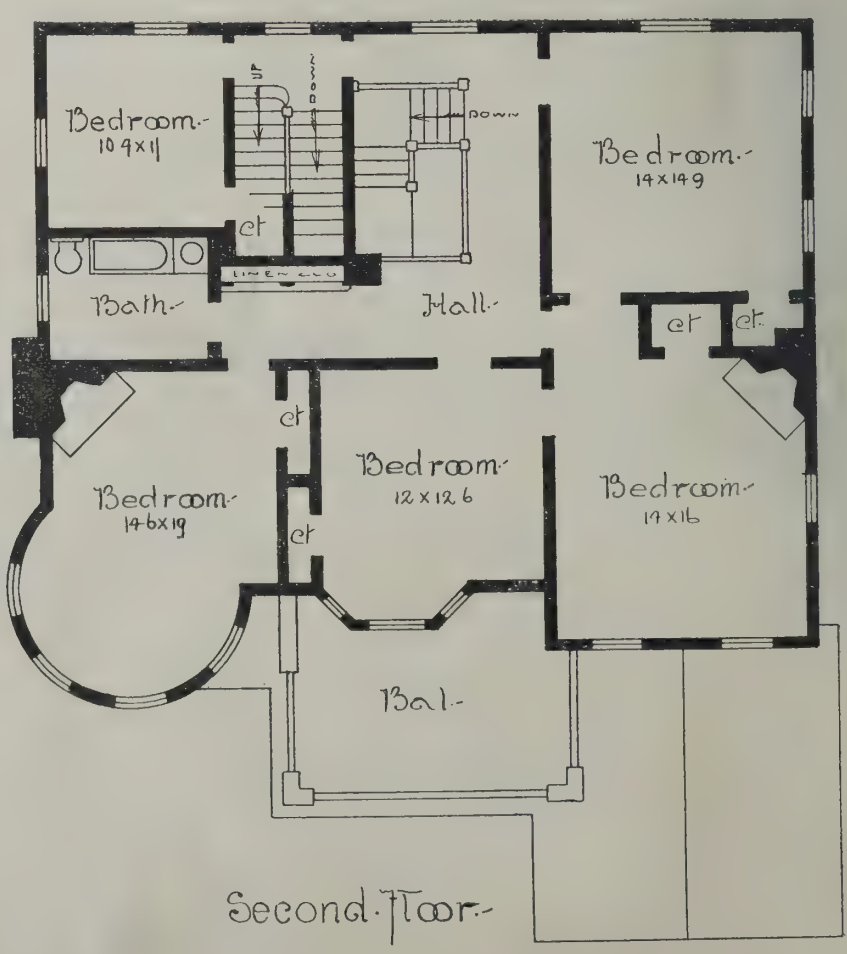


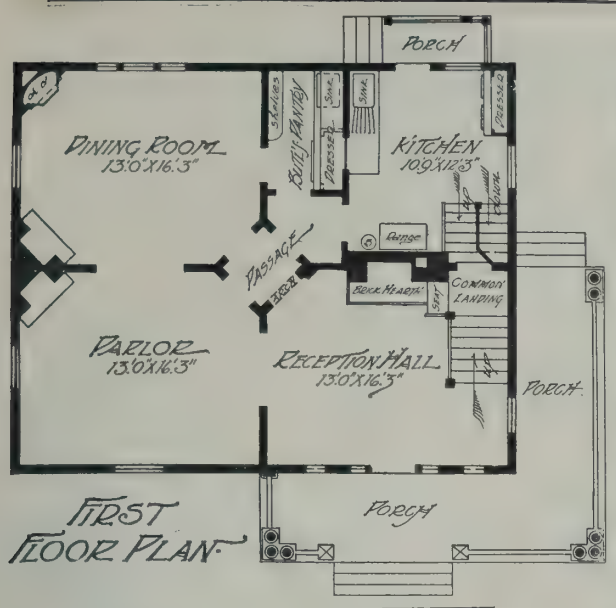
FIG.1.—SHOWING THE MANNER OF CONSTRUCTING FLOOR AND CEILING.

THE "COPPER" HOUSE, CONSTRUCTED BY MR. NILES POULSON.—See page 15.

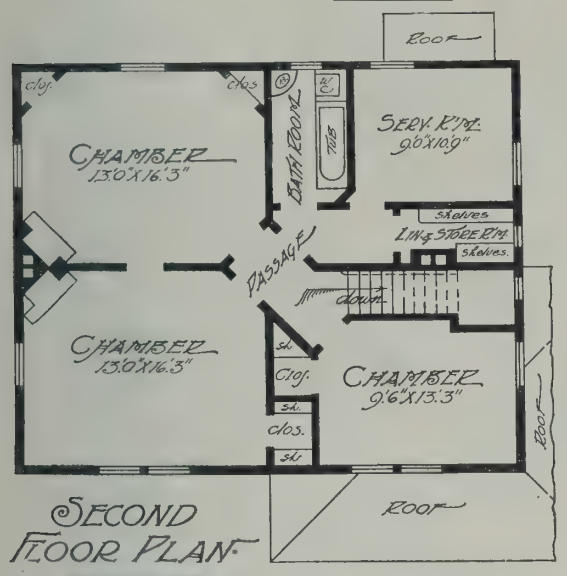




A RESIDENCE AT PARK HILL, N. Y.—See page 16.

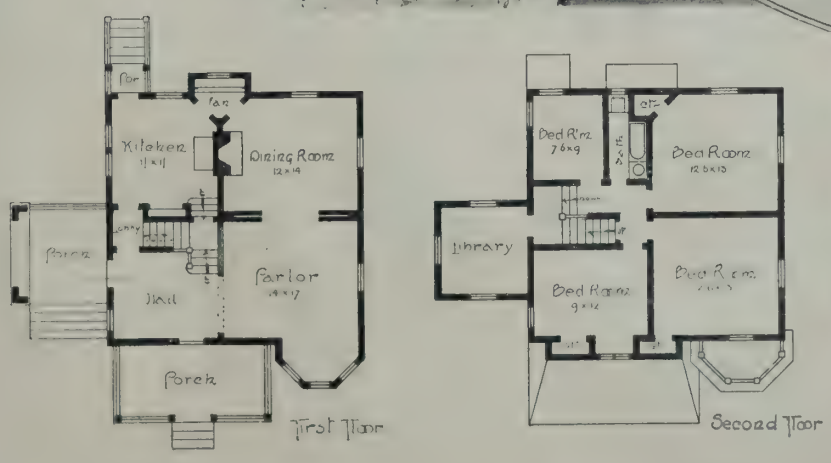


FIRST FLOOR PLAN.

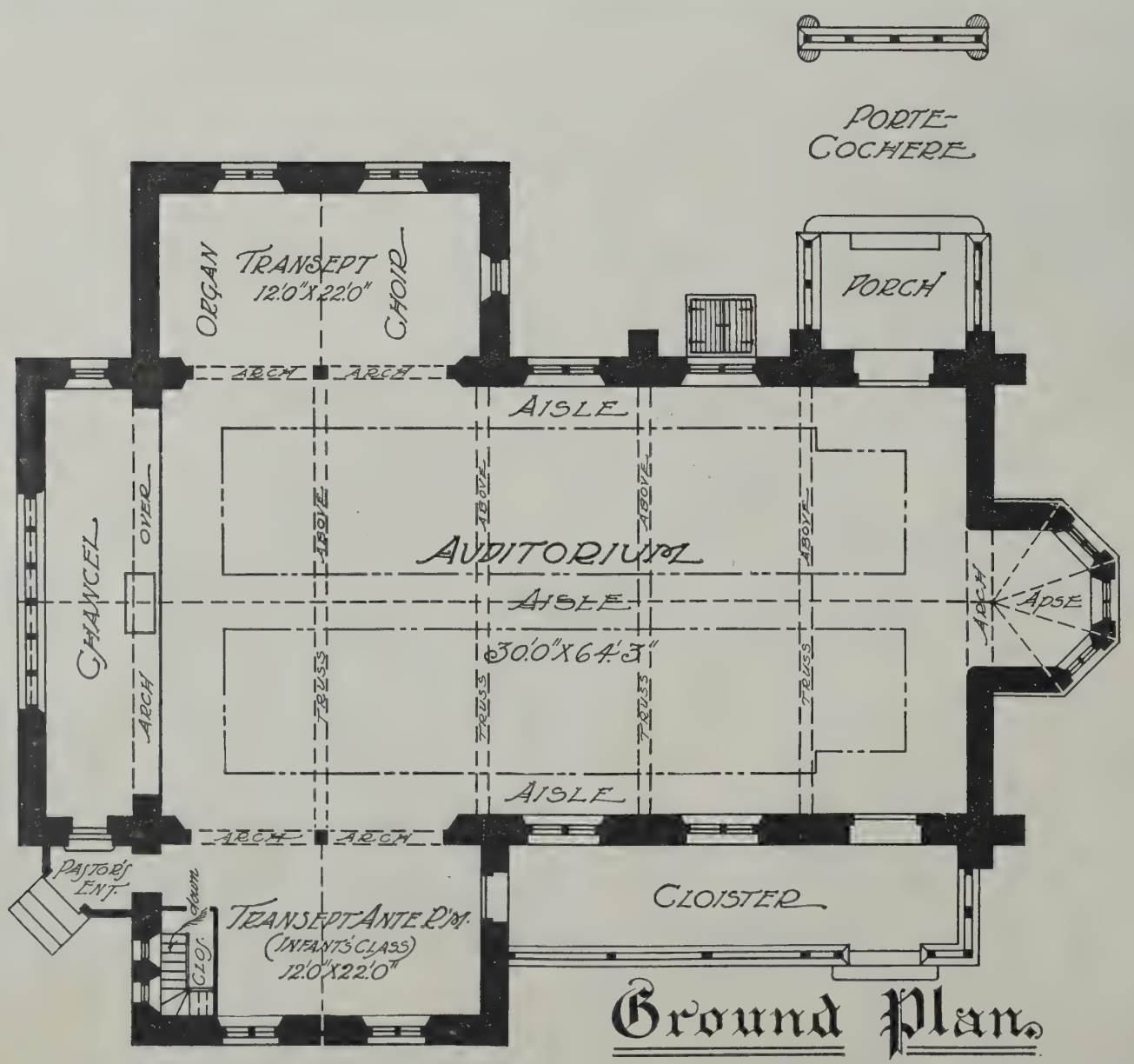


SECOND FLOOR PLAN.

A COTTAGE AT CHEVY CHASE, MD.—See page 3.

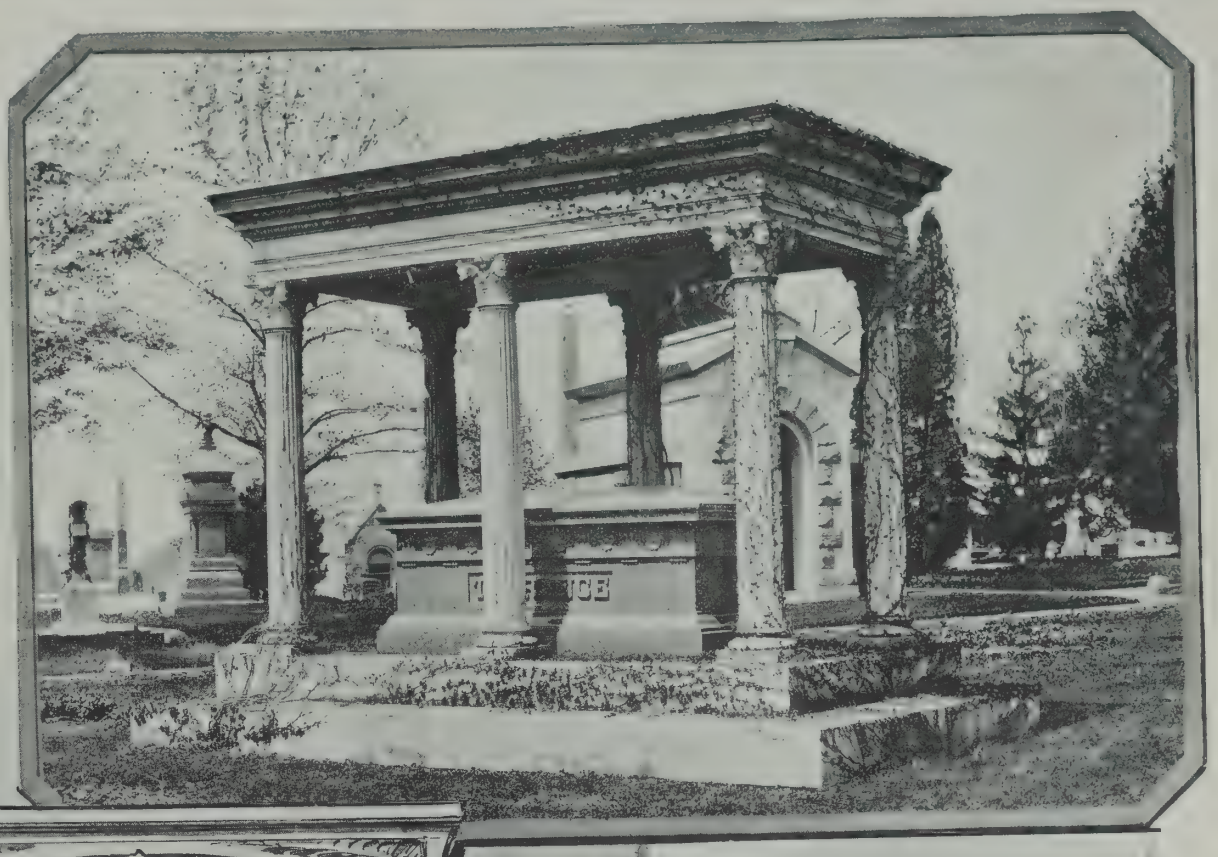


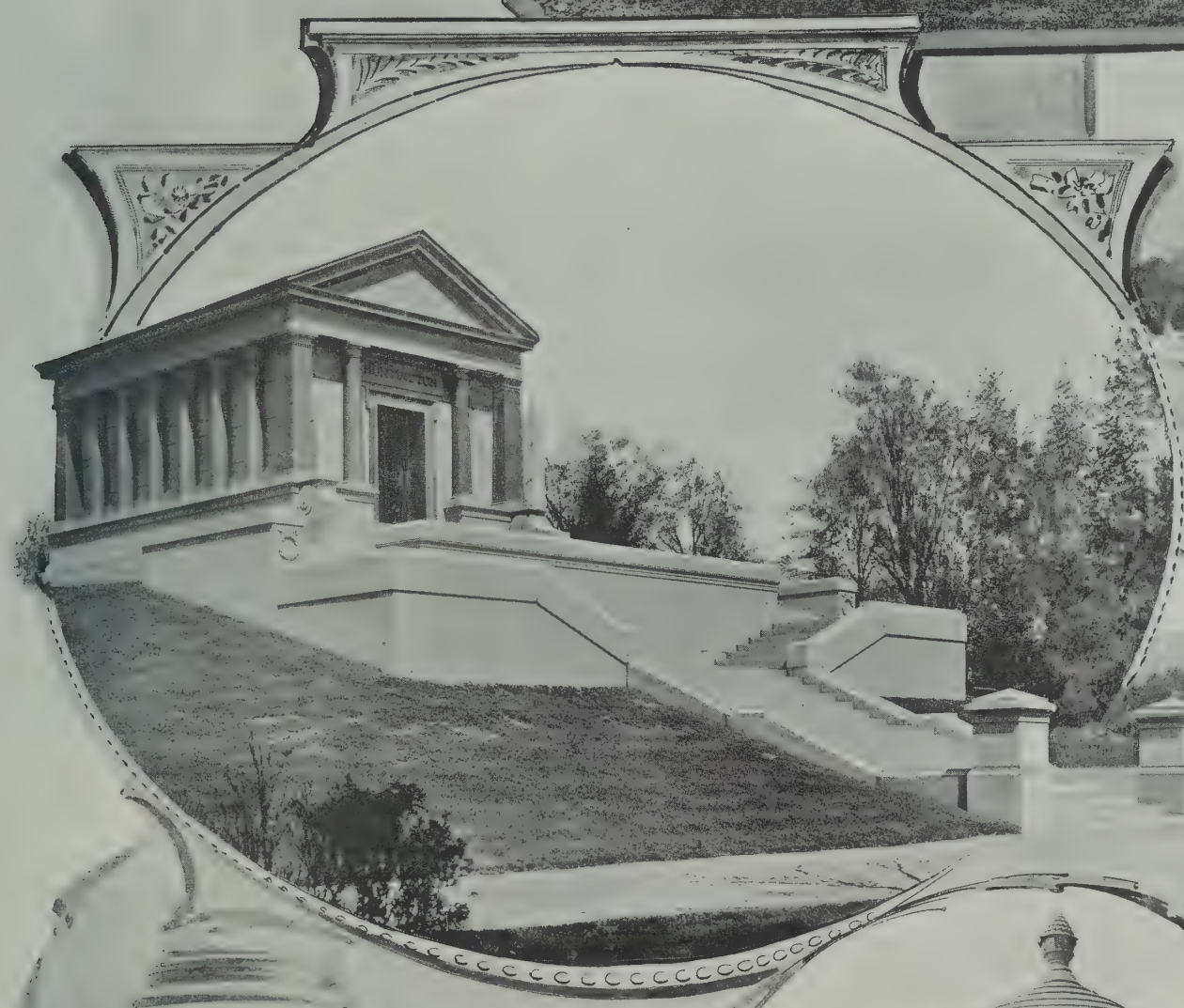
A MODERN DWELLING.—See page 2.



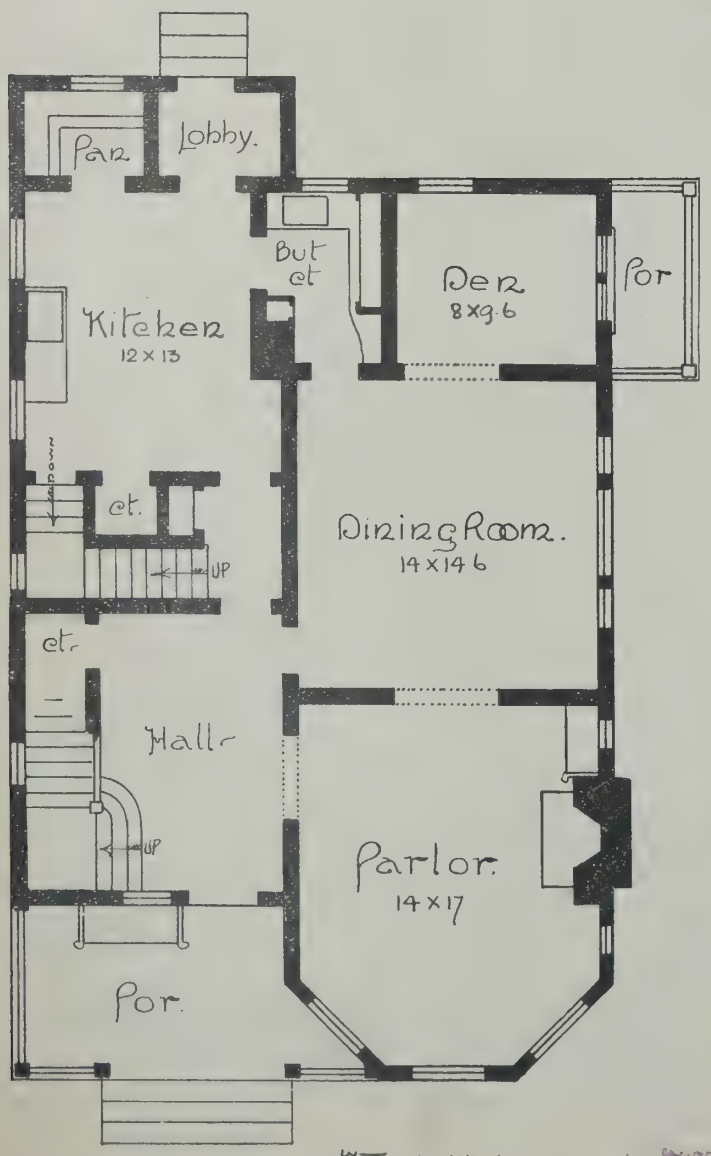
Ground Plan.

PRESBYTERIAN CHAPEL AT OVERBROOK, PA.—See page 3.





MAUSOLEUMS.—See page 3.



First Floor

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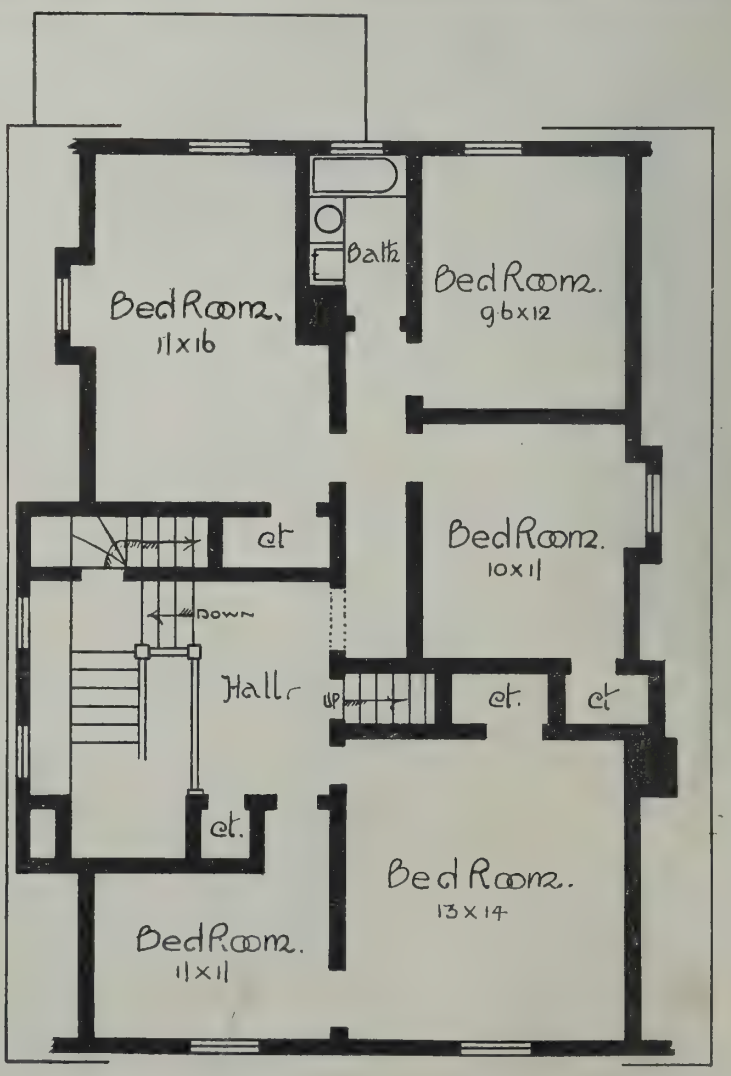
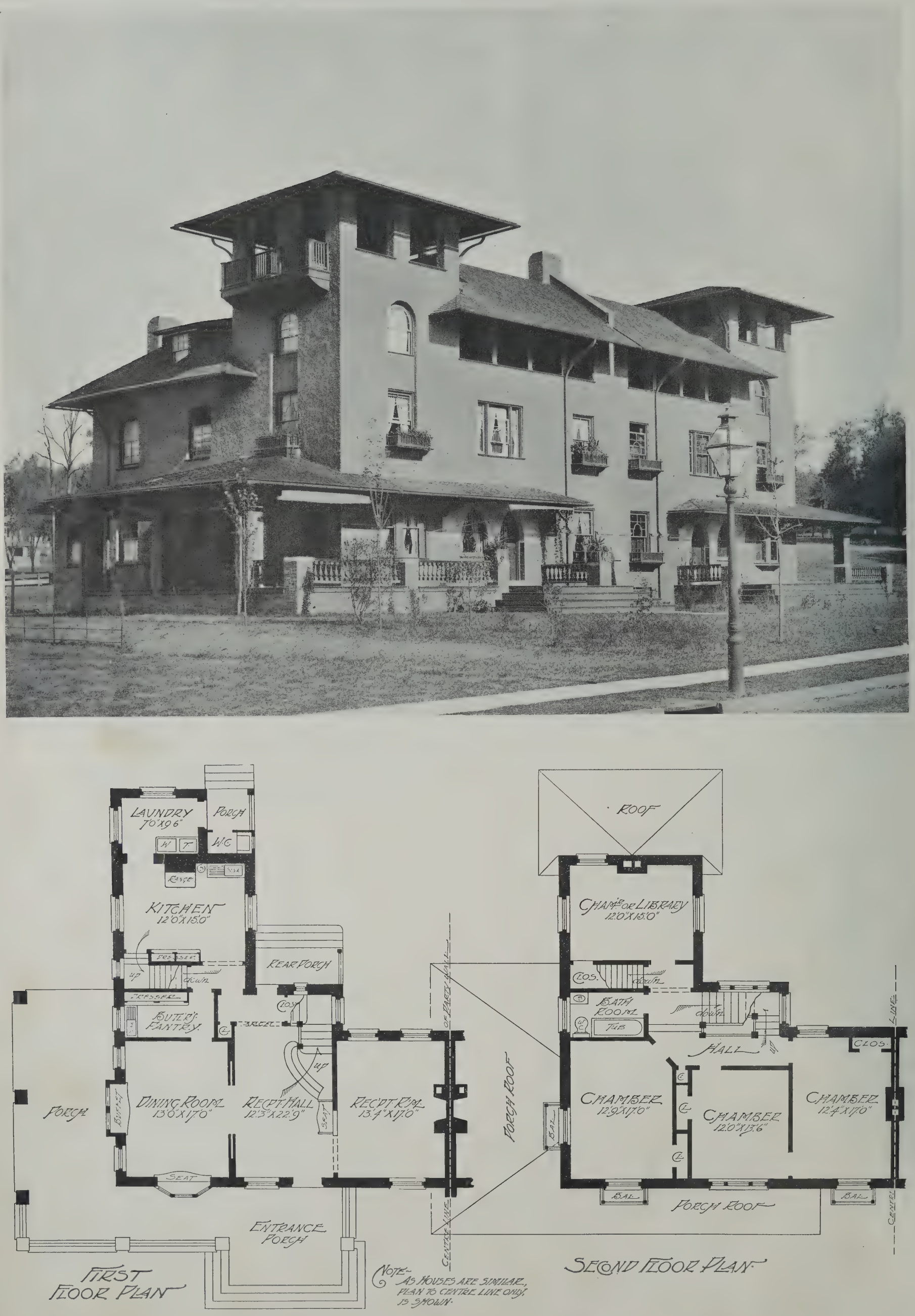


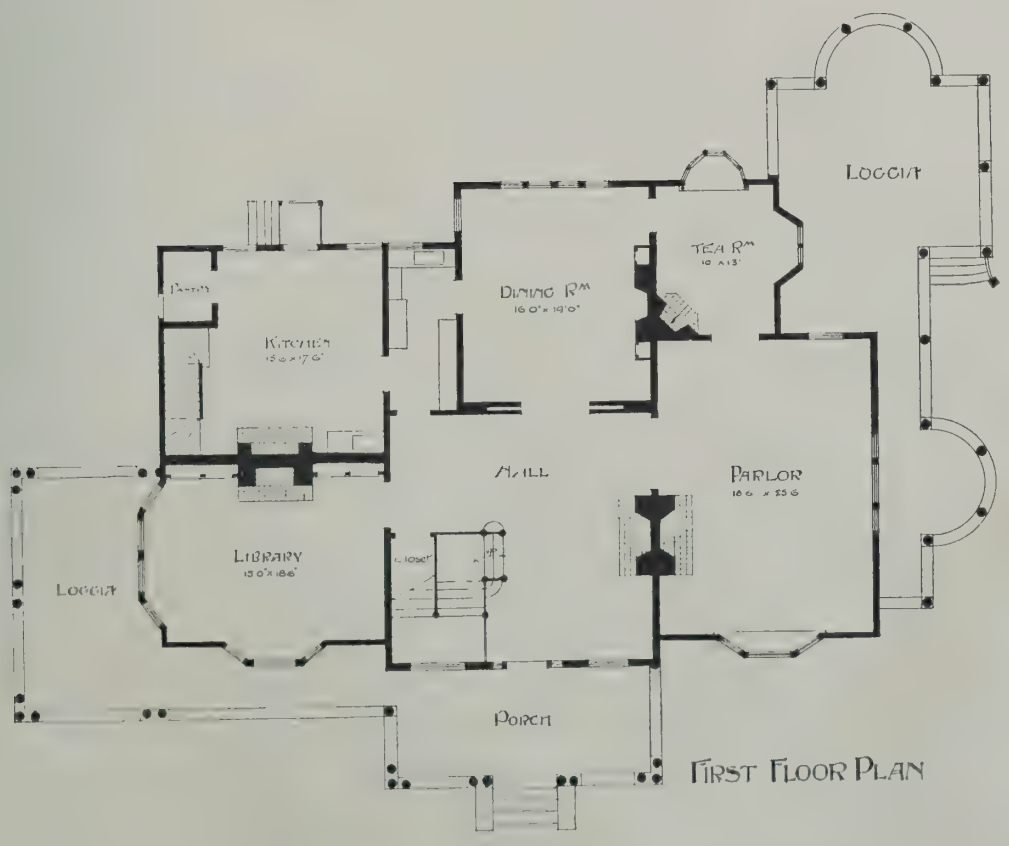
Second Floor.

A DWELLING OF LOW COST.—See page 16.

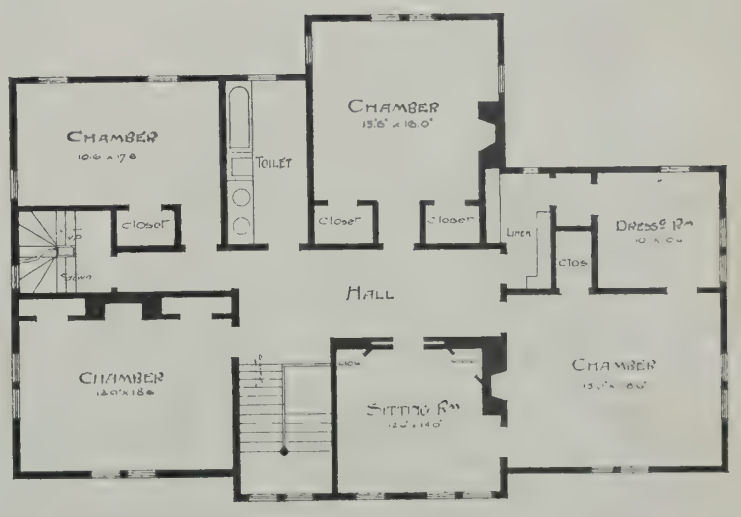
A RESIDENCE AT TENAFLY, N. J.—See page 3.



DOUBLE DWELLING IN THE SPANISH STYLE AT PELHAM, PA.—See page 16.

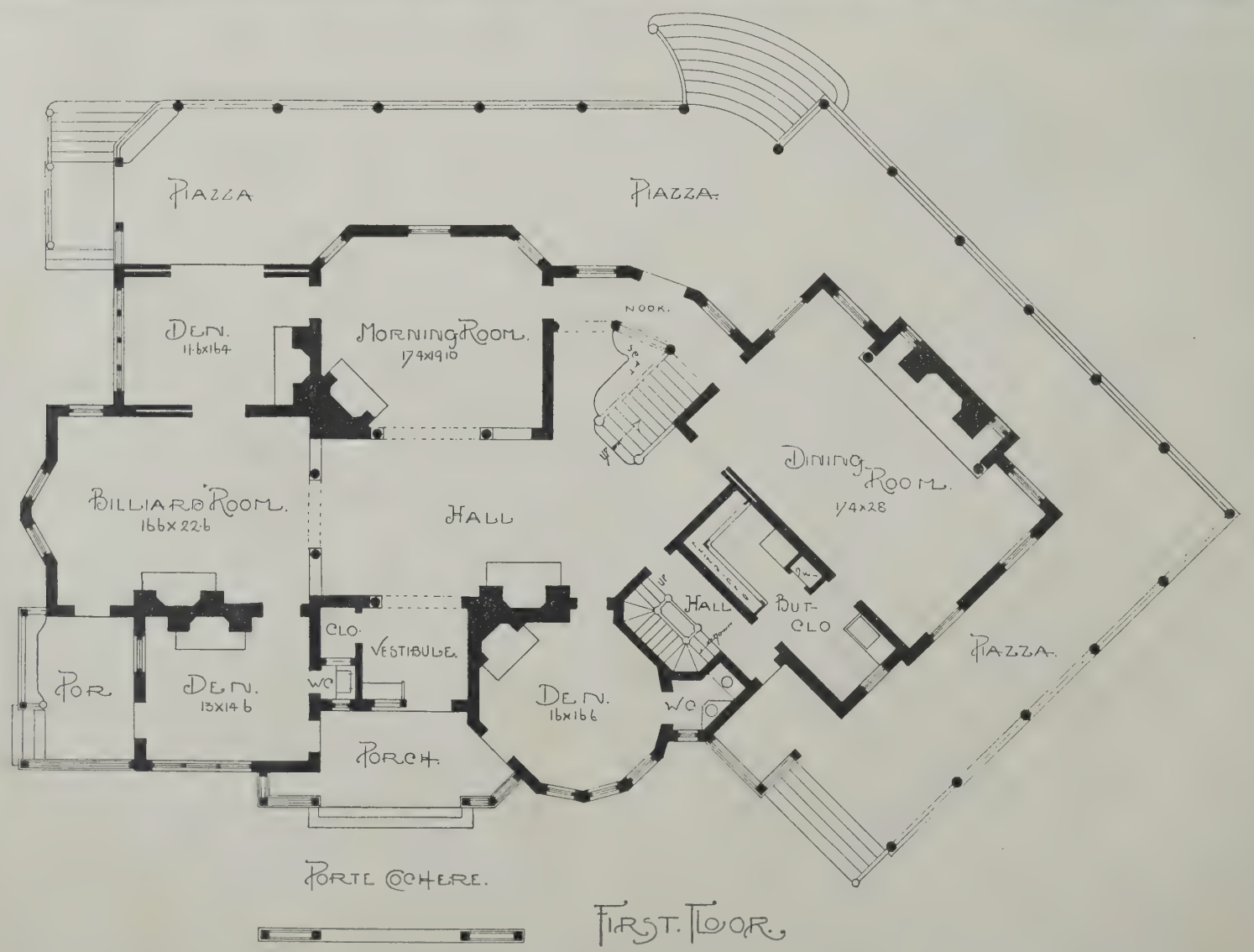


First Floor Plan



Second Floor Plan

A RESIDENCE AT YONKERS, N. Y.—See page 16.

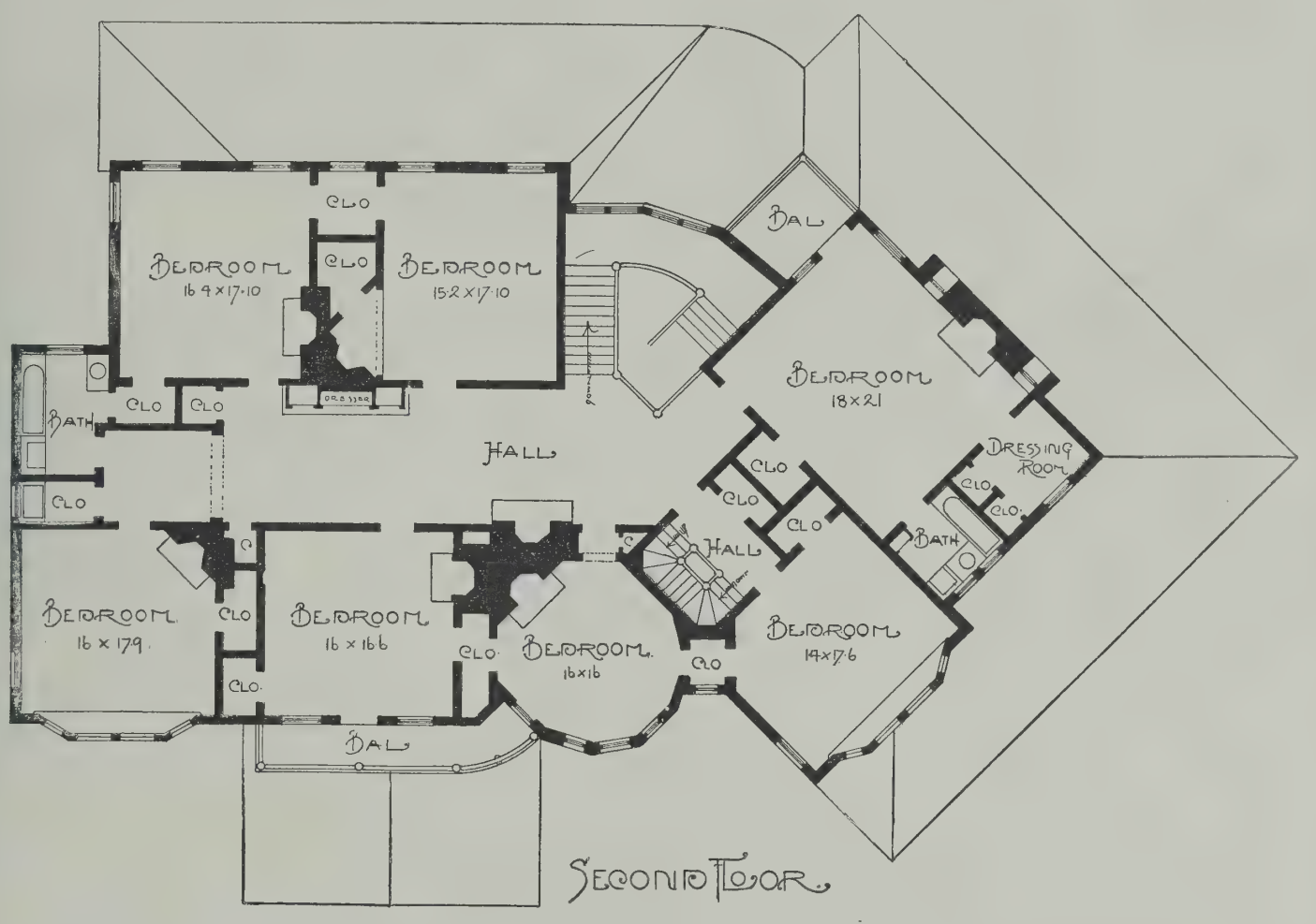


"SPRINGHURST," COUNTRY HOUSE OF THOS. W. PEARSALL, ESQ., BLACK ROCK, CONN.—See page 16.

THE "COPPER" HOUSE.

We illustrate on pages 4 and 5 the "copper" house erected at Bay Ridge, Long Island, for Niles Poulson, Esq., of the architectural iron firm of Poulson & Eger, of this city. The exterior of the house is very unique, and it combines features in construction and ornamentation which cannot fail to be of great interest to builders and architects, because the ornamentation is at least a departure from common practice, for, while something of a similar nature in the way of decorative effects may have been attempted before, the expense has been so great as to prove discouraging. In this case it is claimed that the cost has been kept at a reasonable figure. What has been done in connection with the building might almost be said to mark a new era in both construction and ornamentation, and the whole is a happy combination of copper, brick, and cement, by which a warm, dry and attractive building, and also one that commands attention, is produced. The methods used represent the ideas of the owner to secure a fireproof construction, and to make use of galvano-plastic metal in a way to produce striking effects. The work as it stands represents the result of long and careful study on the part of the owner, and in its execution many novel methods have been employed.

The entire exterior is covered with copper. Many of the panels are ornamented with designs of a unique character. Conspicuous features of ornamentation are four circular panels representing America, Europe, Asia, and Africa, which are copied from the celebrated Albert Memorial. Each of these panels is three feet in diameter; there being two at the front and two at side of house. The entire copperwork was done by what is known as the galvano-plastic process, which permits of the execution of the most intricate designs. The design to be obtained is first produced in wax by a very simple method, and the mould thus formed is placed in a battery. The frieze, extending entirely around the building, between the first and second stories, was made in this way, in lengths of some twelve feet, and fastened to the angle iron frame by means of flanges and rivets.



"SPRINGHURST," COUNTRY HOUSE OF THOS. W. PEARSALL, ESQ., BLACK ROCK, CONN.—See page 16.

It may be interesting in this connection to describe the manner in which the exterior walls of the house are constructed. In the first place, the foundation was prepared in the usual manner, and topped with a stone belt course extending entirely around the house. Upon this was erected a wrought iron skeleton, made of Tee and angle irons placed some four or five feet apart. At proper intervals from the belt course to the main cornice were placed 4 x 4 angle irons, which were secured to the upright framing. At each sill and lintel course was placed a horizontal angle iron, extending entirely around the building, and above the window sill was another for receiving the floor construction. The angle irons were covered with pilasters made of deposited copper, embellished with designs of an attractive character. The pilasters were first riveted to the angle irons in such a way as to leave at each edge a flange, to which were riveted the copper panels carrying ornamental designs in bas-relief. After the copper panels were put in position the entire copperwork was backed up with an eight-inch brick wall, extending from the foundation to roof. The latter is covered with red tile, and the tower, which is covered with the same material, terminates in a copper finial. The roof of the veranda, extending across a portion of the front and side, is supported by cast iron columns, while the balcony around tower is made of cast iron and heavily plated with copper, so as to withstand the action of the weather.

The floor plans present an idea of the interior arrangement, showing the location of the various apartments. It will be seen that entrance to main hall is through vestibule. The first impression given one upon entering the hall, as shown in the engraving on front page, is the liberal use of metal and the peculiar formation of the floor and ceiling. The floor is finished with delicately tinted tile, so arranged as to constitute an elaborate design of striking effect. The decorated cast iron ribs, arched across the ceiling, the bronze treated columns between the openings into the various apartments, the rich and elaborately decorated mantel, the wrought iron work in the semicircular archways, and the iron railing about the circular opening on the second floor, are a combination to produce an effect which is peculiarly striking. The ceiling of main hall as well as that of all the other rooms in the house, is of novel construction, and is of great interest to the building trades. It involves the use of ordinary flat bar iron and cement, and represents the ideas of the owner of the building as to what constitutes absolutely fireproof construction. The scheme pursued is such that the ceiling of one room is the basis of the floor of the apartment above. The ceiling (Figure 1, C) is made by placing upon the four brick walls of which a room is composed, an octagonal frame made of angle iron. From each corner of the octagon are sprung two arches, or ribs, of flat bar iron, and where the bars cross each other they are clamped together with V-shaped bolts, as shown in C, Figure 1. This arrangement leaves a small octagonal space in the centre of the ceiling, formed by the intersection of the bars already referred to. This space is covered by shorter bars, which are arched across from corner to corner of the central octagon, as indicated in C, Figure 1. These are also clamped to the main bars by V-shaped bolts, thus forming a complete dome of wrought iron. The construction is such that any pressure from above only tends to make the construction more secure, the strain on the bars being taken up by the octagonal frame. After the latter has been put in place the four corner spaces and the triangular spaces between the bars are filled by domed panels of plaster of paris and cement one inch thick. These panels were formed by means of an india rubber bag inflated with air and stretched on a frame a trifle larger than the size of the panel desired. This was then pressed from the under side up against the iron ribs, permitting the air of the cushion to form a perfect dome to the opening in which it was placed. Plaster of paris was then poured over this cushion and allowed to set. The bag, or cushion, was then used in the same way in connection with the other spaces until the ceiling was complete, giving a groined arched ceiling of strong and attractive construction. After the under side of the ceiling was finished, what may be termed ribs of cement were built up on top of the flat iron bars, as shown in section Figure 2. These cement ribs were made by placing two boards parallel and filling in between them with cement and concrete. Before the cement, however, was put in, round wooden blocks slightly tapering were placed at intervals between the boards, so that when the cement was set, the boards were removed, and the round blocks taken out, there was left a series of openings in the cement ribs, as shown at D, Figures 1 and 2. These openings, or port holes, as they are called, are made use of in connection with the heating and ventilation of the house, and will be referred to later on. After the ribs were built, heavy wire was stretched over them from all sides of the room, as shown at E, Figure 1. These wires were designed to support a layer of wire cloth (F, Figure 1), upon which in turn was placed a layer of cement and concrete three to four inches thick. If, instead of the cement floor as used in this case, it should be desirable to employ wood, the sleepers could be imbedded in the cement and the flooring nailed to them in the ordinary manner, as shown at G and H, Figure 1.

Figure 2 represents a cross section through the flooring and ceiling of a room taken at A, B, Figure 1, the plaster of paris panels, concrete ribs, and openings through them, all being clearly indicated.

Figure 1 shows the manner in which the wire is stretched across the concrete ribs, the position of the wire cloth for supporting the cement, and a wooden floor placed upon sleepers imbedded in the cement. The little arrows indicate the direction of the hot air beneath the floor after it leaves the furnace pipes.

In some of the rooms the ceiling is of an ornamental character, as, for example, the ceiling of the drawing-room is produced by placing on the under side of the flat iron bars, forming the wrought iron dome, mouldings made of plaster of paris, or *papier-mâché*, which are fastened by suitable hooks and cement. On these mouldings rest the ornamental arched panels, which are made in plaster over an air cushion on which has been placed a gelatine cast of the ornamentation desired. After the panels are put in position, the construction is the same as that employed in connection with the plain ceiling. The centre of the ceiling of the various rooms in the house has a thickness to the level of the floor above of five to six inches, while at the sides the thickness runs up to eighteen and twenty inches.

The library is handsomely fitted up with paneled seat and bookcases built in. Drawing and dining rooms open into conservatory made of cast iron rafters and supports, and covered with ⅜ inch glass. At one side, and connecting with conservatory, is a hot-house complete. The dining-room is partitioned off into a breakfast room by folding doors, carrying wrought iron panels of exquisite designs. At the extreme end is the kitchen and its apartments, and also servants' hall, all of which are fitted up in the most approved fashion. Upon the second floor are three bedrooms, billiard room, sewing-room, two bathrooms, dressing-room, and two servants' bedrooms. The rooms are finished with plaster applied directly to the brick walls, and then covered with paper of artistic shade and design.

Another very interesting feature in connection with this house is the method employed for the heating and ventilation. In the basement is a hot-air furnace provided with a coil, so that both hot air and steam can be used in warming the rooms. The air is taken in from the outside of the building, and distributed to the floor of the various rooms by the ordinary method, as shown at D, Figures 1 and 2. The peculiar construction of the floor, with the port holes in each rib of cement and concrete, allows the hot air to pass from the furnace pipe through the various spaces formed by the plaster of paris panels, and thus circulate under the entire floor before entering the rooms through the register placed in the floor or side wall. The result is to make the cement floor a huge radiator, thus keeping the apartment at a comfortable temperature at all times. In the main rooms on all the floors are open grates and fireplaces of rich and artistic designs, finished in electro-bronze, brass, silver, and nickel, and provided with blowers which may be folded up in such a way as to occupy very small space at the top of the grate opening. These ventilating fireplaces are so made that fresh air is brought in from the outside of the house to a point behind the grate, and then carried around the firebox and the three vertical cast-iron flues which convey to the chimney flue the products of combustion. At intervals above the fire are perforated

plates, which extend across the air flue in such a way as to retard the flow, and cause the air to become highly heated before it enters the room through openings just over the mantel. The house may be further heated by steam by indirect plan. In the basement is a Gold's heater, consisting of a series of radiators surrounding a firepot. These are contained in a brick chamber, in the upper portion of which are also suspended a number of radiators. The cold air is taken in from the outside of the house, circulates about the radiators, which are filled with hot water, and is distributed to the various rooms of the house in the usual manner. The temperature can be readily raised or decreased as may be desired. The drawings of the structure were prepared by James M. Farnsworth, architect, No. 5 Beekman Street, New York.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

A RESIDENCE AT PARK HILL, N. Y.

We present herewith on page 6 of this issue a residence recently erected for Francis B. Chedsey, Esq., at Park Hill, N. Y. The design is treated in the Colonial style and has many excellent features, including the carved frieze, tower, and chimney. The plans show a very convenient interior arrangement, which is trimmed and finished in a handsome manner. The underpinning and all stonework where shown is built of rock-faced granite, with irregular pitch joints. The exterior framework is sheathed with hemlock boards, placed on diagonally, and well spiked with studs. This sheathing is covered with manila paper, and then shingled with white pine shingles. It is painted cream color with brown trimmings; white sash and bottle green blinds. The roof is shingled and painted red. Dimensions: Front, 44 ft. 6 in.; side, 37 ft. 6 in., not including piazza. Height of ceilings: Cellar, 8 ft.; first story, 10 ft.; second story, 9 ft.; third story, 8 ft. 6 in. The main hall and vestibule are trimmed with quartered oak. They have paneled wainscotings and ceiling beams. The vestibule floor is paved with tiles, while the floor in hall is laid with oak. The staircase is an ornamental one with carved newels, spindle balusters and rail. The first landing is provided with a paneled divan. The fireplace is trimmed with tiles and furnished with an oak mantel with mirror and columns. The archways at stairway and den have spindle transoms. The remainder of the trim is of white pine, partly treated in colors and finished natural. The parlor is treated in China white. It has a circular projection and an open fireplace with a tiled hearth and facings, and a dainty mantel of excellent design. The library and dining-room are finished natural, and they have fireplaces with tiles and mantels. Pantries and kitchen are wainscoted with narrow beaded stuff, and are fitted up with the usual fixtures in the best possible manner. The second floor contains five bedrooms, large closets, and bathroom. Bathroom is wainscoted with ash and is furnished with enameled tub and other fixtures with exposed plumbing. Third floor contains billiard-room, two bedrooms and trunk room. Cemented cellar contains furnace, laundry and other apartments. Cost, $9,500, complete. Mr. Christopher Meyers, architect, 361 Broadway, New York.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

A RESIDENCE AT YONKERS, N. Y.

We present herewith in this issue, on page 3 and 13, a residence erected recently for James B. Dickson, Esq., at Yonkers, N. Y. The engraving presents an excellent example for a country house, designed in the Colonial style of architecture, with classic detail, and it contains many good features, including a broad, spacious piazza, formed of wooden columns, clustered, and supporting the second story balconies. The foundation is built of stone, and the underpinning of buff brick. The superstructure is of wood, and the exterior framework is covered with clapboards, and surmounted with a massive wood cornice and frieze. It is painted Colonial yellow, with ivory white trimmings. The fence surrounding the property, with buff brick columns and a wooden balustrade, is also a good feature. The first story contains parlor, dining-room, and library, opening directly into a square entrance hall, with a paneled wainscoting, ceiling beams, and an open fireplace opposite staircase, the latter being of a most exquisite character, designed in a chaste and artistic manner. It has oak steps and risers, and a mahogany rail and newel caps. The balusters, newels, and all woodwork in hall are treated in ivory white. This staircase is lighted by a stained glass window with good effect. The parlor, library and dining-room are treated in ivory white, and the fireplaces shown in these apartments are provided with Mexican onyx facings and hearths, and mantels of old Colonial style. The tea room, between parlor and dining-room, is treated in a sea green color, and is fitted up with a paneled window seat and an open fireplace. The kitchen is entered through butler's pantry, and both of these apartments are wainscoted, and fitted up replete. The second story contains four bedrooms, sitting-room, toilet room, and boudoir, treated in colors, and furnished with the usual necessary closets and fixtures respectively. The servants' staircase, leading from the kitchen, continues on to attic, which is divided off into servants' bedrooms, trunk room and storage. Cemented cellar contains furnace, laundry, and other necessary apartments. Estimated cost, $18,000. Messrs. Renwick, Aspinwall & Owens, architects, 367 Fifth Avenue, New York.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

A DWELLING OF LOW COST.

We present on page 10, as a subject for our colored plate in this issue, a cottage of low cost, which has recently been erected for Benjamin Harman, Esq., by the Forest Park Heights Company, at Springfield, Mass. The engraving presents an unusually attractive design of most satisfactory treatment. A particularly attractive elevation, with a really well-arranged plan, makes it one which could be utilized with advantage. It is a difficult matter to obtain a design with the combined advantages of a pleasing exterior and a good plan at so low a cost; and one has only to look around and notice the style of buildings of this class which are, as a rule, erected, to appreciate the design. The construction used in the execution is of the usual kind, but thoroughly substantial. The foundation is built of stone, and the underpinning of brick, laid up in red mortar. The building above of wood, is covered on the exterior with clapboards and shingles, and painted Colonial yellow, with white trimmings. The roof is shingled and stained moss green color. Dimensions: Front, 27 ft. 6 in.; side, 43 ft. Height of ceilings: Cellar, 7 ft.; first story, 9 ft.; second, 8 ft. 6 in.; third, 8 ft. The hall is trimmed with oak. It has a floor laid with oak in narrow widths and highly polished, and an ornamental staircase turned out of similar wood. Parlor, dining-room, and nook are trimmed with ash, and the former contains an open fireplace fitted up with tiled hearth and facings, and an excellent mantel. Kitchen and pantries are wainscoted and trimmed with whitewood, and each apartmen is fitted up with the best fixtures. Dining-room and kitchen have hardwood floors, and the latter has a stairway to second story. The second and third floors are trimmed with whitewood, and finished natural. The second floor contains five bedrooms, closets, and bathroom; the latter is wainscoted with narrow beaded ash, and provided with porcelain fixtures and exposed plumbing. Third floor contains two bedrooms and ample storage. Cemented cellar contains furnace, laundry, and other necessary apartments. Cost, $3,500, complete. Messrs. Winslow & Wetherell, architects, Philips Building, Boston, Mass.

Our engraving was made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

DOUBLE DWELLING IN THE SPANISH STYLE AT PELHAM, PA.

The subject of illustration on page 12 is a double dwelling in the Spanish style, recently completed by Messrs. Wendell & Smith, at Pelham, a suburb adjoining Germantown, Philadelphia. Our engraving shows a building true in style, entirely devoid of unnecessary ornamentation, being simple in treatment and reposeful in effect. The low roofs with their great overhangs cast their deep shadows over the surface of the rough plastering, broken only by the window openings beneath. Mottled brick has been used for piers and most of first story, with sills, voussoirs, etc., of light stone; all above plastered and tinted light terra-cotta; small overhanging flower balconies of wood; trimming color, brown, sash painted yellow. The well shaded porches, wider at sides, with heavy balustered rail, form interesting corner features. Dimensions: Front, 41 ft. 9½ in. to centre of party wall, exclusive of porch projection; side, 49 ft. 7 in., not including porch or bay. Height: Cellar, 7 ft. 6 in.; first story, 9 ft. 6 in; second story, 8 ft. 6 in.; attic, 8 ft. Pointed arch entrance with similar window at side, door having glazed upper panel, opens directly on the reception hall, with seat at side. Staircase having ornamental newel and turned balusters all in oak; wide opening to reception room, having fireplace with mantel of good design above. Dining-room with recessed buffet having window over, connects with kitchen, provided with usual fixtures, through butler's pantry having dresser and sink. Laundry in rear, fitted with tubs; finish chestnut. Second floor plan shows four chambers with closets and bath fitted with usual fixtures of best make. Attic, four rooms. Cellar, cemented, contains fuel storage and other apartments. House is heated by steam and lighted by electricity and gas, all from central station. Messrs. Keen & Mead, architects, Thirteenth and Walnut Streets, Philadelphia, Pa.

Our engraving was made direct from a photograph of the building, taken specially for the SCIENTIFIC AMERICAN.

"SPRINGHURST."

The engravings and floor plans presented herewith in this issue on pages 1, 14 and 15, illustrate "Springhurst," the country house of Thomas W. Pearsall, Esq., at Black Rock, Conn. The site selected is "Grover's Hill," famous in Revolutionary times, and the most commanding location on Long Island Sound. The building as now completed is one of the most picturesque, commodious, and best appointed houses on the Sound, and is constructed in a thoroughly workmanlike manner, and of the best materials. The aim of the architect has evidently been to design a building, with the lines well broken by numerous bay windows, tower, porte-cochère, a low, spacious piazza, and chimneys which are an architectural feature in themselves, and also to provide the interior with large, well lighted and ventilated apartments, which are trimmed and finished in a handsome manner. The perspectives show an appropriate and quiet style of architecture of the (English) Queen Anne order. The first story from basement to second story is built of brick, and the exterior walls are laid up in red mortar. The second and third stories are partly half-timbered and shingled; the space between the beams being filled in with stucco work, and all shingles are painted light yellow, with bottle green trimmings. The whole tone of coloring is most happily applied in keeping with the surroundings. The roof is shingled and painted red with good effect. Dimensions: Front, 93 ft.; side, 48 ft., not including piazza. Height of ceilings: Basement, 8 ft.; first story, 11 ft. 6 in.; second, 10 ft. 6 in.; third, 8 ft. The first floor throughout is trimmed with quartered oak, and finished natural. The main entrance hall and staircase is one of the special features, and very effective. The newel post and columns that form the arcaded effect between hall, billiard-room, and morning-room, extend to ceiling, and are very effective in their relation to hall. Hall, billiard, dining, and morning rooms have massive ceiling beams and paneled wainscotings. The dens have similar wainscotings and ribbed ceilings. The large, open fireplace in hall is built of brick, with hearth and facings of same, with wrought-iron trimmings, and a massive oak shelf, supported on caryatides, and carved in an elegant manner. The north den is furnished in the Japanese style, with curios and decorations recently brought by the proprietor from Japan. Dining-room is provided with a grand, old fireplace, with tiled trimmings, and a massive mantel with carved columns. This room is finished in the Baronial style. The color scheme in decoration is well shaded, and in most excellent harmony with the furnishings, trimmings, and the tone desired for each apartment respectively. The floors throughout are laid with oak and highly polished. The butler's pantry, and rear hall and stairway, are conveniently located, and provided with the usual fixtures complete. The second, and also third floor, is trimmed with whitewood, and finished natural. Second floor contains seven bedrooms, large closets, two bathrooms, and dressing-room; and the third floor is provided with seven bedrooms, bathroom, open hall and trunk room. The bathrooms are furnished with the best modern conveniences in a handsome manner. The basement contains kitchen, sewing-room, servants' dining hall, cold storage, wine-room, laundry, furnace, and coal rooms. Mr. Bruce Price, architect, 150 Fifth Avenue, New York City, N. Y.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

A VERY handsome walk can be laid out by using two or three shades of brick, and disposing them in patterns similar to those which are so successful in tile floors.

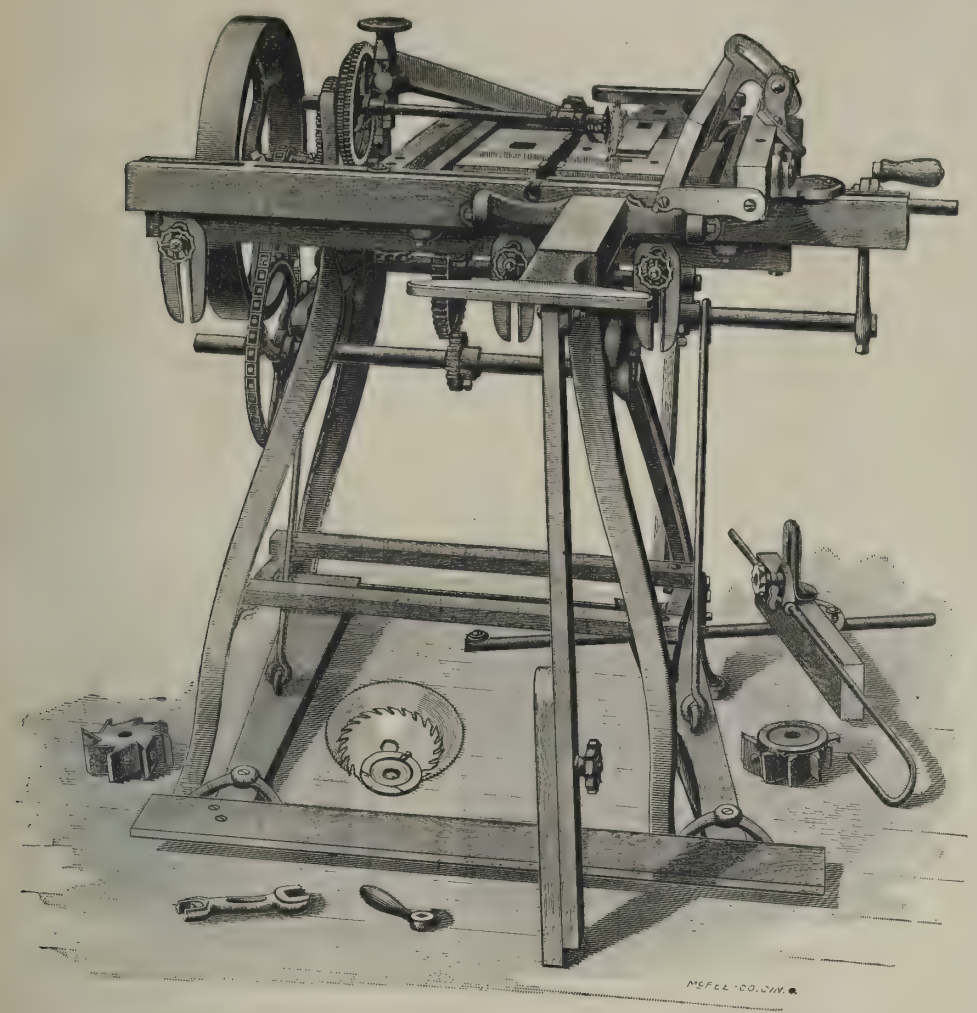
If it is not possible to secure bricks of uniform hardness, a good effect and evenness of wear can be secured by selecting the hardest for the centre of the walk, and using the softer bricks for a border design.

Onyx Paper.

Messrs. Witsch & Schmitt, of 445 Pearl Street, New York City, have introduced a great novelty to the building trade in their onyx paper. Almost every known material which has been used in mural decoration has been imitated in wall paper. Decorated metals, carved ivory, stamped leather, fresco painting, silk brocades, etc., have all had their turn and been faithfully reproduced, and the effects which have been gotten with these materials have been obtained at a fraction of the cost of the most costly materials and products. Onyx is a very handsome building material, but its price, especially as regards large slabs, has made its use practically prohibitive, but now architects, decorators, builders, etc., will find that there is no better decorative material, or more beautiful and useful, than onyx paper which, is comparatively inexpensive. It can be used in lobbies, vestibules, parlors, ceilings, bathrooms, and for columns, panels, borders, table tops, mouldings, etc, as well as on a large scale for the decoration of public halls and buildings. It is a perfect imitation of the real onyx, showing every detail of the veining and color of onyx, marble. It can be easily pasted on the wall, coloring of the columns, or on any smooth surface. Walls, ceilings, or columns, rubbed, and finished, it is When properly varnished the difference between the hardly possible to detect It is especially adapted imitation and the real article. Halls, etc., where a cor for houses, theatres, public halls, onyx would be required siderable quantity of the real onyx New York City, in ed. Among the latest buildings in may be mentioned th which onyx paper has been used and Seventh Avenue, in Harlem Casino, at 124th Street columns are covered wi which the ceilings, dadoes, and ch beautiful effect.

AN IMPROVED WOODWORKING MACHINE.

The illustration represents a foot and hand power combination machine for ripping, cross-cutting, or jointing, which has been perfected by L. F. Parks, manufacturer of woodworking machinery, No. 2622 Colerain Avenue, Cincinnati, Ohio. The machine is set for ripping, but is easily adjustable to various kinds of work, the speed being changed with great facility, even while the saw is running. The machine has scroll saw, shaper, lathe, and emery wheel attachments. It is very substantially made, and is sold at a low price.



A COMBINED RIP, CROSS-CUT AND JOINTER WOODWORKING MACHINE.

An Award for Spiral Spring Hinges.

We note that the spiral spring hinges which were exhibited at the Columbian Exposition, of 1893, by Bommer Bros., of 355 Jay St., Brooklyn, N. Y., have obtained the medal and an award, in which the judges speak of them as follows: "Excellence of the compound spring which greatly increases the power, but is so elastic that it permits the door to open easily, and to close without slamming or noise. The appearance is elegant and attractive, material, workmanship and finish first class. By ingenious construction nearly one inch is gained in length of spring. The parts of sheet metal struck up are practically unbreakable, being made by special machinery, and are interchangeable, and the ends of the flanges are turned up and show a double corrugation at point where greatest strain comes, and in double acting hinge form a gauge showing how deep it should be let into the wood, and also covering same where cut." We illustrated and described this hinge in the June number of the BUILDING EDITION of the SCIENTIFIC AMERICAN.

The Action of Freezing on Cement.

According to an account published in *Engineering News*, it appears to be ascertained as a fact, based on more than 6,000 recorded results, that Portland cement suffers no surface disintegration under any condition of freezing, but that in most cases its strength is reduced, in some cases by as much as 40 per cent. Rosendale cement is disintegrated when exposed to frost while setting, and its cohesion may be entirely destroyed by immersion in water which becomes frozen around it. Salt water prevents this disintegration to a large extent, but seems to have an injurious effect on the strength, and the cement below the disintegrated surface is stated to be increased in strength when the Rosendale cement is used. A mixture of a natural rock cement and of Portland cement is found to give very satisfactory results, as its surface does not disintegrate, and its strength is increased by the freezing. Portland cement is injured less proportionately as the percentage of cement in the samples is reduced. Again, though lime mortar is ruined by alternate thawing and freezing, fairly good results may be looked for in the case of brick masonry when the mortar is kept frozen for some time after laying.

PALMS, rubber plants, and all foliage plants used in the house should have a weekly washday. Using a soft cloth or sponge, each leaf should receive a light washing with lukewarm water, and the soil should be loosened about the roots. Plants breathe through their leaves, and cannot grow well unless they are kept free from dust.

Wood Pulp in Architecture.

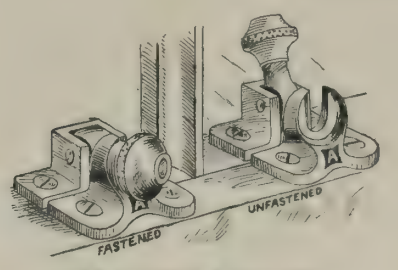
It is claimed that wood fibre decorations do not contract or expand in changeable temperatures, do not warp or twist, and do not crack or peel. Anything that a sculptor can shape in clay or plaster, or that the engraver can put in any material, can be reproduced. The decorations can be taken into a room bare of anything but the studding and rafters, and screwed into position, forming a hard and cheap finish, and a decoration. The ceiling may be formed in panels or otherwise, the covings enriched or plain, cornices, centrepieces and friezes in convenient working breadths and lengths, and plain and embossed sheets in different thicknesses for the general wall space, with wainscoting skirting boards. No lath or plaster is necessary, the fibreware itself being thick enough, and forming a wall of greater strength and durability than one of plaster, and affording a surface for decoration and color. Imitation of oak, walnut, maple, or cherry is possible, with wainscoted and paneled walls and ceilings, in colored. ceramic-finished panels of artistic subjects. The embossed panels offer facilities for decoration which no other material outside of carved wood possesses. The architectural revivals of the present day, and the general desire to possess more artistic and refined homes, render necessary a greater outlay in interior decorations than formerly. There has been a decided tendency toward the pure Colonial, Renaissance and Tudor architecture, or what may better be described as the half-timbered or Queen Anne. There is also a decided liking, which is strongly favored by many architects, for the Elizabethan, with its ornate and richly carved decorations.

Fireproofing Woodwork.

The Commercial Cable Building, a twenty-one story structure being erected by the Commercial Cable Company, Broad Street, New York City, is being constructed to be entirely fireproof. Every particle of woodwork entering into its construction has been specified by the architects, Messrs. Harding & Gooch, to be treated by the electric fireproofing process of the Electric Fireproofing Company, 308 Hudson Street, Newark.

THE ATWOOD SASH LOCK.

We present an engraving of the Atwood sash lock made by the Atwood Lock Co., of 56 Summer Street, Boston, Mass. This lock possesses several points of excellence, not the least of which is that it prevents the sagging of the upper sash, thus excluding wind and dirt, and doing away with sand bags and weather strips, and it



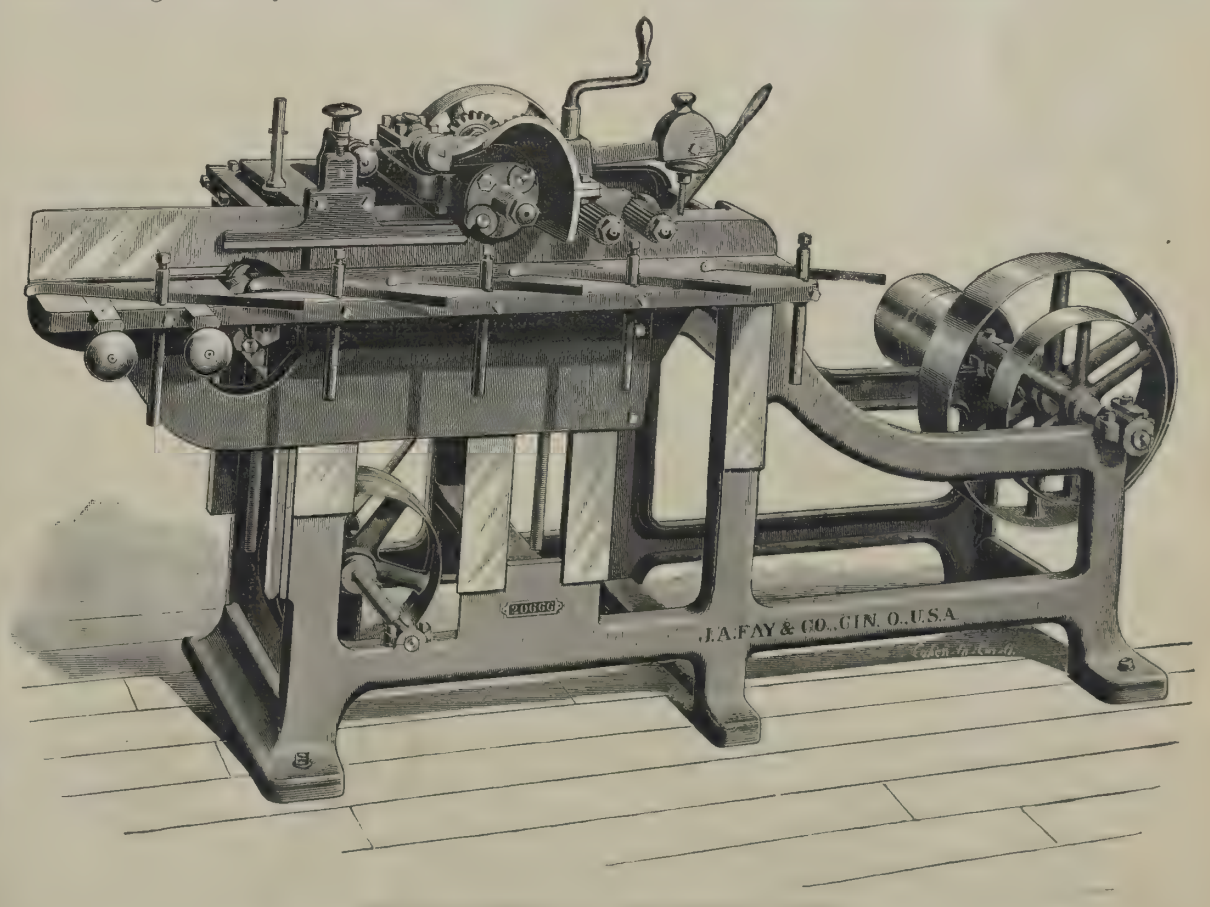
THE ATWOOD SASH LOCK.

securely locks the window, binding the meeting rails together. The fastener is small, but possesses great strength, and cannot be operated from the outside, and it has no springs to get out of order. Besides stopping all shaking and rattling of the windows, it effectually prevents the beating in of rain, and the shrinking and swelling of the sash do not interfere with the working of the lock.

THE Stanley Works, of New Britain, Conn., and No. 79 Chambers Street, New York, are sending out to architects an artistic little pamphlet, giving a hint of the extensive variety of butts and hinges they make, and more especially the Stanley ball bearing steel butts, which have great strength, and are substantially without friction, and noiseless. A large line of door bolts, blind trimmings, and other articles of builders' hardware, from wrought steel, is made at the Stanley Works.

THE FAY PATENT DOOR "STICKING" MACHINE.

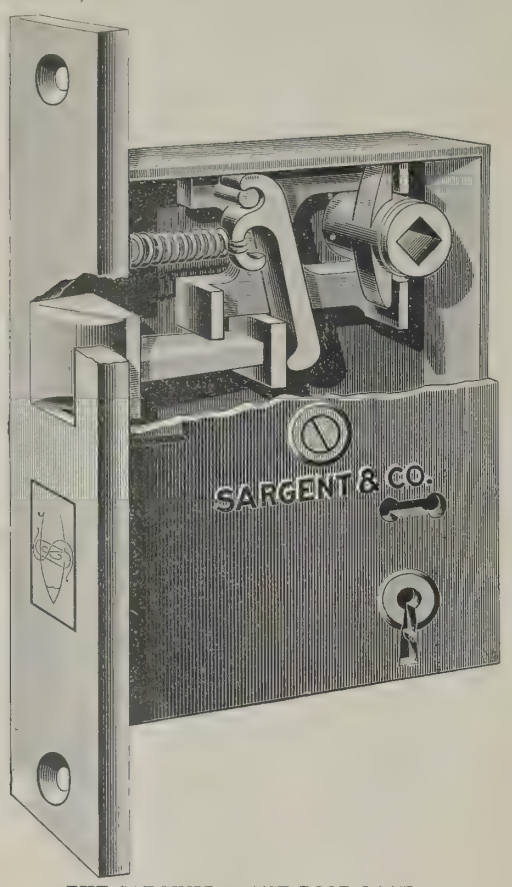
This machine is designed for sticking sash, doors, blinds, and any other work where the upper and lower sides are to be finished. Its capacity is to 4 inches in width and 16 inches in depth, so that wholesale manufacturers of doors and sash find it particularly desirable. The arbors are of steel, and run in self-lubricating bearings. They are large in diameter, and have end adjustments. The lower arbor is gibbed to the main frame, and is adjustable vertically, independently from the bed. Guides are provided for holding the grooves of door stiles and rails in line, or guiding and supporting muntins as they are passed through the machine. The machine is fitted with two-fluted feed rollers, which are strongly geared, and changes of feed are provided for different kinds of work. A combined bonnet and pressure bar is provided, so arranged that it can be swung out of the way or moved to and from the cutters to accommodate the work being done. There is a shop number on each machine, and a number on each casting, by which they may be identified, and should be mentioned in ordering supplies. The tight and loose pulleys are 8 x 4 inches, and should make 875 revolutions per minute. It is made by J. A. Fay & Co., 297 to 317 West Front Street, Cincinnati, Ohio.



THE FAY PATENT DOOR "STICKING" MACHINE.

THE SARGENT HOUSE DOOR LOCK.

We are in receipt of a neat little booklet describing the Sargent house door lock, made by Sargent & Co., of New Haven, Conn., and New York City. The hardware is but a small item in the whole cost of a building, and no part is more often slighted to save a few cents, for after a lock is mortised into the door it is out of sight, excepting the face, and is usually out of mind also until the lock breaks down, and the chances are that the locksmith will



THE SARGENT HOUSE DOOR LOCK.

say that the lock is not worth repairing. A new lock is substituted, so that the combined expense of the two locks is greater than the cost of a good lock in the first place. We present an engraving of one of the Sargent high grade lock.

The easy spring, which is applied to all locks having the name Sargent & Co. cast on the lock, enables the latch bolt to work very freely, so that the door does not have to be slammed, nor stand ajar, but latches gently as it is closed. This is accomplished by using a good stiff spiral spring, with a long leverage for the latch bolt and a direct pull for the knob, thus producing the desirable combination of easy on the latch bolt, firm on the knob. It has great durability. There is nothing to get out of order. It works beautifully. Inside locks and front door locks are also made with the easy spring principle, and it is also applied to Sargent's cylinder locks which have the small grooved flat keys.

Architectural Notes.

To overcome the objections to the use of wooden dowels for the purpose of securing screws in stonework, a Düsseldorf engineer has devised an ingenious method of obtaining a firm anchorage. A wire of such a thickness as to fill the thread is wound into the screw, commencing near the head, and following the thread to the point. It is then wound backward over the wire which is already in place but in this second winding it is given a wider pitch, so as to leave wider spaces between the successive convolutions. This double winding forms a kind of nut, which is introduced into a hole already drilled in the wall to receive it. The hole is slightly larger than the outside diameter of the wire nut, and after insertion the interstices are filled up with plaster of-Paris cement or other material in a plastic condition. When the said binding material has become sufficiently hard and firm, the screw bolt which has served as a core, or another screw bolt having the same diameter and pitch, is screwed into the wire coil, and may now be screwed out and in repeatedly without damaging the wall.

A correspondent of the *Brickbuilder* writes to that journal suggesting that the time has come when the science of fireproofing should have specially recognized representatives. He goes on to say: "General Sooy Smith is a recognized authority on foundations; the late General Gillmore was equally acknowledged on the line of cements and mortars. We have experts in sanitary matters and on all forms of steel construction, but when a specially complicated question of fireproof construction arises, there seems to be no one who is accepted as being the best referee on the subject. It is believed that there is a possible field for some bright, thoroughly trained young man to make a reputation for himself in this direction, and at the same time be of immense service to contractors, engineers, and architects generally. We are quite ready to welcome the electrical engineer, the sanitary engineer, and the expert on foundations or steel work. An expert fireproofing engineer would be equally desirable, and ought not only to find ready employment for his talents, but might also be able to make fireproofing more nearly an exact science, which it is not at present."

Dr. William H. Robb recently read a paper, before the New York State Medical Association, on the subject of decaying timber in houses as a possible cause of sickness. Warm, damp cellars, that are poorly lighted and ventilated, favor the growth of many sorts of bacteria. The lecturer said: "Judging from the variety of diseases found in a single house where there is dry-rot, we believe that the specific germs of various diseases find in this a nidus in which to grow and multiply; from the cellar they migrate to all parts of the house. Food, water and air are all affected." He quoted the case of a fine house in a healthy New England town, whose occupants were never free from sickness. On investigation, it was found that the cellar was more than half full of old boards and decaying lumber, some of which had lain there over fifty years. The cellar was cleared out and ventilated, and the house has since been entirely free from sickness.

ARCHITECTURAL WOOD-TURNING AND SPIRAL MOULDING.

A. Dickey & Co., 43 Bristol Street, Boston, Mass., have entered into a new branch of the woodworking business, namely, the manufacture of grillework. Their specialty in this line is screenwork, made from architects' draw-

ARCHITECTURAL WOOOD-TURNING AND SPIRAL MOULDING.

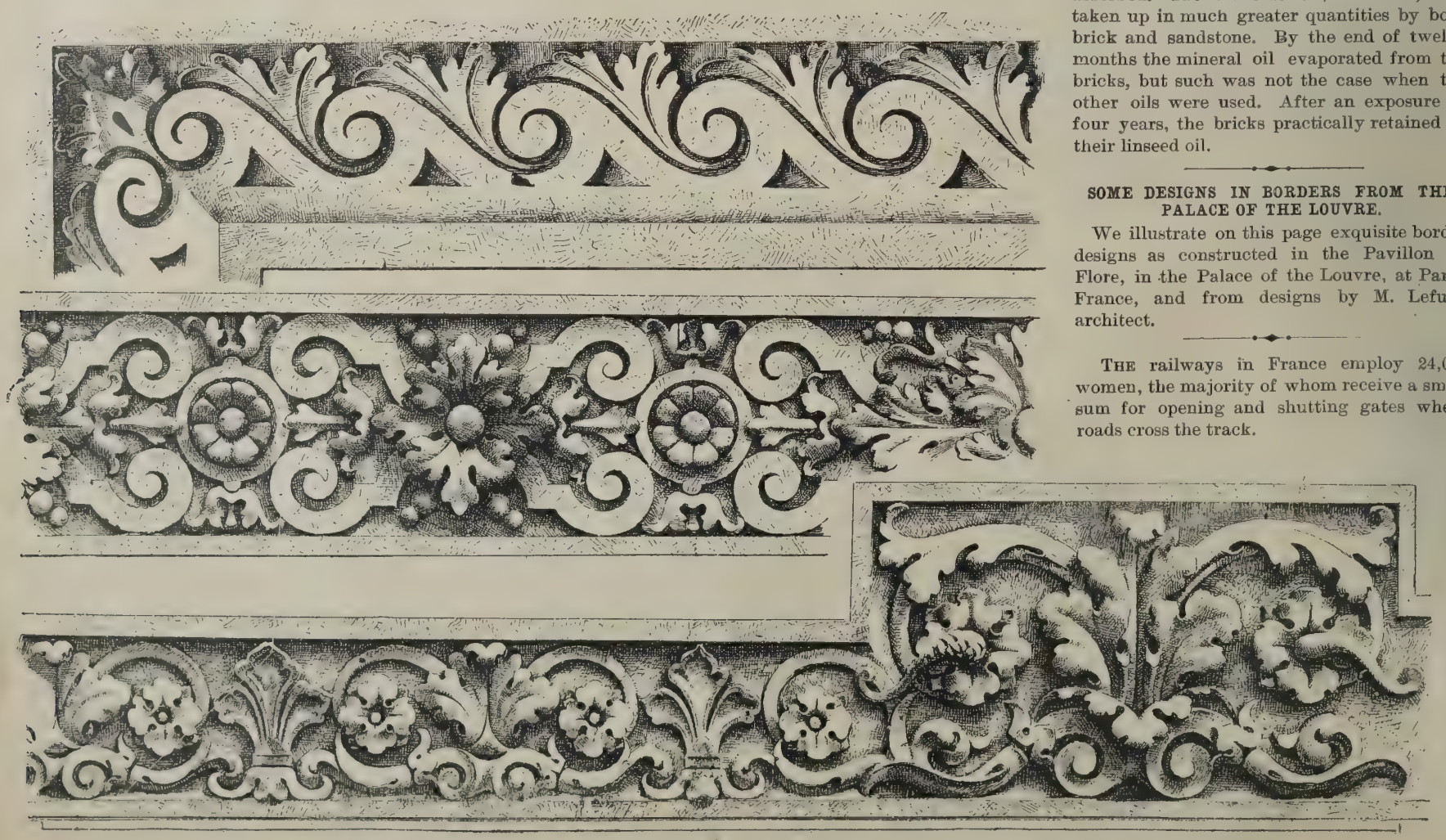
ings or from those of their own designer. As a manufacturer of stair posts, balusters and rails, porch columns, etc., the firm have a well-established reputation. The twisted and carved work shown in our engraving is particularly noticeable. A catalogue will be furnished on application, and estimates submitted.

A NUMBER of experiments were recently made to ascertain the length of time that brick and sandstone are rendered waterproof or protected by oil. The three oils used were linseed oil, boiled linseed, and crude mineral oil. The amount of oil and water taken up by the sandstone was very much less than that absorbed by the brick, although the area of the sandstone cube was much greater. Equal amounts of the raw and boiled oil were absorbed. The mineral oil, however, was taken up in much greater quantities by both brick and sandstone. By the end of twelve months the mineral oil evaporated from the bricks, but such was not the case when the other oils were used. After an exposure of four years, the bricks practically retained all their linseed oil.

SOME DESIGNS IN BORDERS FROM THE PALACE OF THE LOUVRE.

We illustrate on this page exquisite border designs as constructed in the Pavillon de Flore, in the Palace of the Louvre, at Paris, France, and from designs by M. Lefuel, architect.

THE railways in France employ 24,080 women, the majority of whom receive a small sum for opening and shutting gates where roads cross the track.



SOME DESIGNS IN BORDERS FROM THE PALACE OF THE LOUVRE.

SCIENTIFIC AMERICAN.

Building Edition.

A COLONIAL RESIDENCE AT PRINCETON, N.J.

No 130 AUGUST 1896.

MUNN & CO., PUBLISHERS, NEW YORK

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SCHUMACHER & ETTLINGER, NEW YORK.

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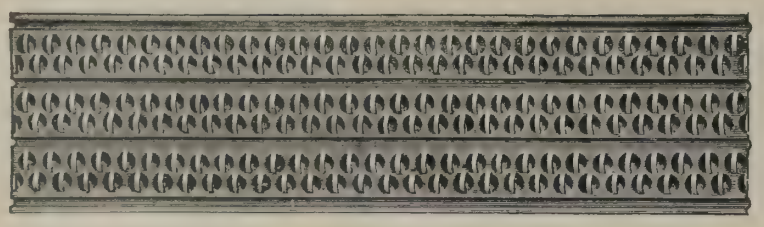
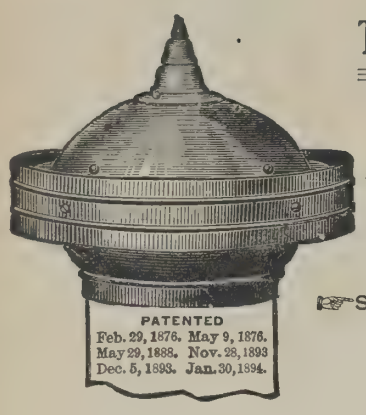


"Piqua" Lath is made from the best quality of steel, in sheets 27¼ x 48 inches, and each sheet covers exactly one square yard of surface. The corrugations shown in cut are 3¾ inches between centers, thus insuring the greatest rigidity. Samples and prices on application.

THE CINCINNATI CORRUGATING CO., Box 328, Piqua, Ohio.



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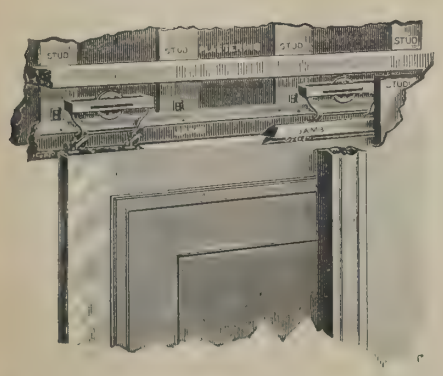

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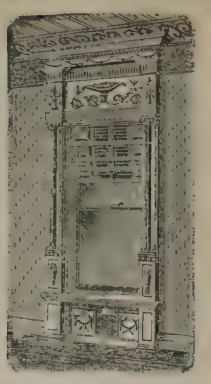

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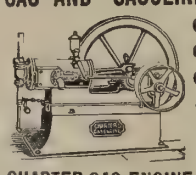

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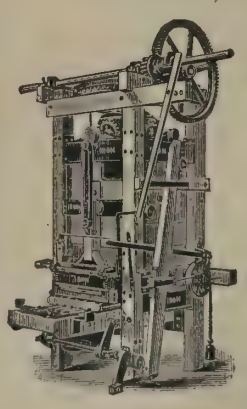

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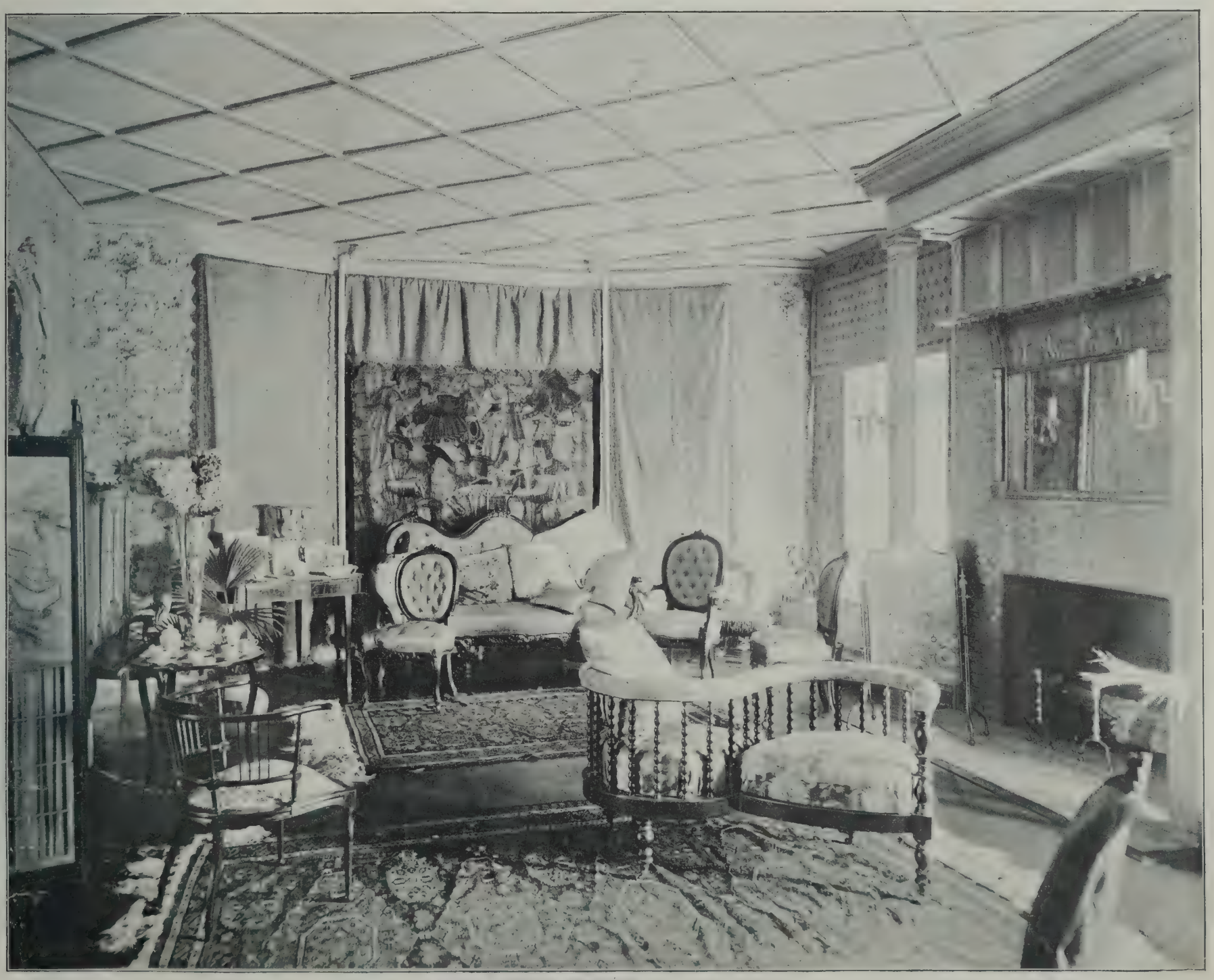

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INTERIOR VIEW OF A DRAWING-ROOM IN A RESIDENCE AT SOUTH ORANGE, N. J.—See page 20.

Scientific American.

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NEW YORK, AUGUST, 1896.

THE

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SCIENTIFIC AMERICAN, BUILDING EDITION.

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THE RELATION OF THE ARCHITECT TO THE ENGINEER.

The recent suggestion by one of the Commissioners of the new East River Bridge, New York, that an architect should be appointed to collaborate with the chief engineer, with a view to securing a more artistic result in the finished structure, will naturally be received with favor by the architectural profession as a whole, and with a more restricted approval by the professional engineer. Referring to the architectural features of engineering bridge work, Commissioner Salem H. Wales said: "In this country this portion of the work has been neglected on almost all of the great bridges that have been built; and wherever any attention has been paid to it, it has usually been considered of so little importance that it has been put in the hands of a draughtsman, or some one of little or no artistic ability." Mr. Wales concluded by stating that "at the proper time" he would "be prepared to present the name of an architect competent in every way to treat this matter in collaboration with the chief engineer." The question which is here raised is not a new one; but its introduction in so important a connection is very timely, and will direct attention to a matter, which, while it may not have had any great importance in the infancy of modern engineering, is becoming a serious and pressing matter in this day of widespread engineering activity. Architecture and engineering are not separated by so clear a line of demarkation as formerly. The introduction of cheap, high-grade steel has gradually carried the engineer across the dividing line, until it is not unusal to find him collaborating with the architect in the erection of a modern steel and stone building. It is true the architect is frequently his own engineer, and capable of calculating his own strain sheets, as he properly should be; but the fact remains that the engineer has and does frequently collaborate with the architect, and has thereby set a precedent which might well be followed in all great engineering works, where there is an opportunity for the display of architectural skill.

It is undoubtedly true that many fine engineering works have been marred by poorly designed or incongruous details. This has been the result either of artistic incompetence or indifference. Either the engineer does not know or he does not care. The tendency of his training and his daily practice is to develop his perception of the useful, possibly, though not necessarily, at the expense of his perception of the beautiful or purely ornamental. In designing a bridge, for instance, he will be governed in his choice of its style and proportions by the strictest considerations of utility. He will choose that form and those proportions which will give a maximum amount of strength for a minimum amount of material, and this material will be massed together in members whose form will be determined strictly by the work they have to do; and the very details of these members will be designed with a view to rapidity and convenience of erection. This spirit of pure utility has governed all engineering works, and nowhere has it held such undisputed sway as in the art of bridge building. Indeed, it is only by building on lines of strict utility that the larger bridges can be erected at all, at such a multiplying ratio does the dead weight increase with the increase of span. It is not a matter of choice, but of pure necessity, that the general proportions of a large bridge shall be determined by engineering considerations, without regard to their architectural or artistic appearance. At the same time, as Mr. Wales truly remarks: "A structural problem well solved from a mathematical and engineering point of view is almost sure to be beautiful in its ensemble from the artistic point of view."

If the architect is to play any part in the design of engineering works, and particularly bridge works, he should apply his hand with great discrimination. There are certain parts that he should let well alone. In the design of the approaches, the piers, and the general stonework, he can show his fine touch to great advantage—for it is here that the engineer is liable to mar the general effect of the structure—but the adorning hand of the architect should stop at this point.

The bridge structure proper should be left intact, for, if it be correctly designed, it will have a beauty of its own which would merely be spoiled by the addition of any added decoration.

In architecture, it is sometimes possible to accentuate the structural features of a building by skillfully applied decoration; in engineering works in general, it is a risky experiment; and in bridge work, a positive failure. No truer instance of the truth of this statement can be found than the Girard Avenue bridge, Philadelphia, whose simple and truthful structural beauty has been marred by the architectural forms with which its members have been covered up.

In speaking of the ironwork of a bridge, there is an exception to be made in regard to the design of railings, balustrades, lamp-posts, and any similar accessories. These, of course, in common with the stonework, should be left to the design of the architect. Altogether, we heartily indorse the suggestion of Mr. Wales, if the function of the architect only be defined to the extent we have suggested above. In the proposed East River Bridge, there is an opportunity to erect a monumental structure which shall be notable alike for its engineering skill and architectural beauty.

A RESIDENCE AT SOUTH ORANGE, N. J.

We present to our readers, on pages 19, 22 and 23, engravings showing perspective and interior views and floor plans of one of the most artistic and purely English residences in this country. The Old English style is carried out in a thorough manner, not only in the main lines, which are well broken, but in detail, throughout the exterior and interior. The underpinning and chimneys are built of red brick laid up in red mortar. The first story is built of wood, and then covered on the exterior with shingles and stained a dark mahogany color; second story is half timbered, and the beams form panels, which are filled in with plasterwork and left in its natural color. The trimmings are painted a reddish brown. Roof shingled. The main hall, spacious in dimensions, is finished in Old English oak. It has a panel wainscoting four feet in height, and a ceiling heavily beamed. The walls above wainscot, and between the beams in ceiling, are treated in olive green with excellent effect. The fireplace is built of brick, with hearth and facings of same, and a massive oak mantel built in and paneled. The broad, low staircase is provided with massive carved newel posts and balustrade. The first landing is fitted up with a bay window thrown out, and furnished with a cluster of stained glass windows and seat. The side, or porte-cochère, entrance is a convenience, and is provided with a broad door, five feet in width. The drawing-room is a large, well-lighted apartment, and it has several bay windows thrown out; the two on either side of fireplace have paneled seats. It is treated in a yellow white, and the ceiling is paneled diagonally. The fireplace is provided with a tiled hearth and facings, and an elaborately carved mantel with columns extending to ceiling. Dining-room is finished in mahogany, and it has a paneled wainscoting and ceiling beams. It also contains an open fireplace built of brick, with hearth and facings of same, and a mantel handsomely carved. The conservatory is a pleasing feature. The piazzas, isolated as they are shown on plans, are also good features. The kitchen, servants' dining hall, laundry and pantries are trimmed and wainscoted with yellow pine. These apartments are fitted up with all the best modern fixtures complete. The second floor contains a studio at main staircase landing, four bedrooms, bathroom, and two servants' bedrooms, with private stairway to kitchen. These apartments are fitted up in a handsome manner, and the fireplaces are treated with tiles and mantels. Bathroom is wainscoted and paved with white English tiles, and it is fitted up with porcelain fixtures and exposed plumbing. There are four bedrooms and trunk room on third floor. Cemented cellar contains furnace and other necessary apartments. The floors throughout are laid with hardwood. The novel feature of the building is the windows, which are provided with transoms throughout. Messrs. Renwick, Aspinwall, Renwick and W. L. Coulter, architects, 367 Fifth avenue, New York.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

A COTTAGE AT WROXHAM, NORFOLK, ENGLAND.

We present herewith in this issue, on page 21, from the *Building News*, a cottage, which was designed to be erected at Wroxham, Norfolk, England, but is to be erected instead at Kent. It is designed in the half-timbered style of architecture, with excellent effect. The first story is constructed of bricks made of an orange-red color, and the tile hanging to be in bands of fishtail and plain tiles alternately. The roofs are covered with Broseley tile. The main hall, which is used as a living room, is paneled with oak throughout, and it contains a broad, open fireplace, and an ornamental staircase, with landings. The dining-room, paneled with oak, is one of the most attractive apartments. It contains an attractive nook, with fireplace, and paneled seats, and a recessed bay, with a cluster of windows and a paneled divan The ingle, or nook, containing fireplace, is lined throughout with small brown glazed bricks. The kitchen and scullery are well located, and fitted up with the best modern fixtures. There are three bedrooms and one servant's room on second floor, and also bathroom. The cost is estimated at £1,200. Mr. Lawrence Youngs, A.R.I.B.A., 99 Ladbroke Road W., was the architect.

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A COLONIAL RESIDENCE AT PRINCETON, N. J.

We present herewith in this issue, on page 24, a residence recently erected for Prof. Andrew F. West, at Princeton College, Princeton, N. J. The design presents one of the purest types of classic Colonial architecture in this vicinity, and, although the building is built on the square plan, there are many good bits of detail on the exterior, and the plans show a most excellent interior arrangement. The foundation is constructed of local rock-faced stone. The superstructure above, of wood, is covered on the exterior with matched sheathing, paper, clapboards, and then painted Colonial yellow, with ivory white trimmings. Roof shingled and stained moss green. Dimensions: Front, 50 ft.; side, 46 ft., not including piazza. Height of ceilings: Cellar, 8 ft. 6 in.; first story, 10 ft. 6 in.; second, 9 ft. 6 in.; third, 8 ft. 6 in. The interior is finished in a handsome manner in the Colonial style. The doors and windows are handsomely trimmed. The main hall, running through the centre of the building, is provided with massive oak doors, and beaded windows at either side of same. This hall, twelve feet wide and thirty-two feet long, is trimmed with white pine, treated with white enamel. The staircase is treated similar, and is provided with spindle balusters painted white, and rail and newel post turned out of mahogany. The parlor and library are trimmed and treated in a similar manner. Both have open fireplaces, trimmed with birch, and it has an open fireplace, trimmed in a handsome manner. Library is trimmed with sycamore, and dining-room with oak; the latter has a paneled wainscoting and a hardwood floor. The door and window casings are trimmed with carved casings. Kitchen and pantry are trimmed and wainscoted with white pine, and are furnished with all the best improvements. The second floor contains sitting-room, four bedrooms, conservatory, large closets, and bathroom. This floor is trimmed with white pine, and finished natural. Bathroom is wainscoted with oak, and provided with the usual fixtures, with exposed plumbing. The third floor is provided with ample storage and three bedrooms. Cemented cellar contains furnace, laundry, and other necessary apartments. Mr. Joseph Frank, architect, Erie, Pa.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

built of rock-faced stone laid up at random in red mortar. The first story is covered with clapboarding, and painted olive yellow with bottle green trimmings, while the second story is covered with shingles, and stained a mahogany color. The gables in piazza roof, bay and dormer windows are filled in with plasterwork with carved effect. Blinds are painted bottle green. Roof is shingled and painted red. Dimensions: Front, 50 ft.; side, 51 ft., not including piazza. Height of ceilings: Cellar, 7 ft.; first story, 10 ft.; second, 9 ft.; third, 8 ft. Vestibule is paneled in oak, and is provided with a tiled floor. The main hall is trimmed with oak; it has a paneled wainscoting and ceiling beams. The staircase is handsomely carved, and the newel posts extending to ceiling form an arcaded effect. The toilet is conveniently located, and is furnished with wainscot, tiled floor, and the usual fixtures. Drawing-room is treated in a dainty manner with ivory white enamel. It is provided with an open fireplace, with white enameled tiling, and a mantel of exquisite design. Dining-room is trimmed with cherry, and it has an open fireplace, with cherry mantel. Butler's pantry and kitchen are trimmed and wainscoted with North Carolina pine, and are furnished complete. The Rector's study, waiting-room, and lobby are trimmed with oak, and the latter has a tiled floor, while the former is provided with bookcases built in, fireplace furnished in a handsome manner, and a

A MODERN DWELLING AT STRATFORD, CONN.

We illustrate on page 29 a modern dwelling erected for Lorenza Beach Beers, Esq., at Stratford, Conn. The design shows many good features, including a broad piazza, pleasant balcony, and a tower, which adds dignity to the building, and the whole is sufficiently ornamented to give it an attractive appearance. The underpinning is built of bluestone. The remainder of the building is

A COTTAGE AT WROXHAM, NORFOLK, ENGLAND.—See page 20.

with tiles, and ornamental mantels made from special designs. Den is trimmed with cherry, and is provided with a well fitted up toilet. Dining-room is trimmed with oak. It has a paneled wainscoting and a large, open fireplace, furnished with a tiled hearth and facings, and a massive oak mantel. The floors on this story are laid with oak, and highly polished. The ceilings have massive wood cornices to correspond with the trim of each apartment. Butler's closet and rear hall and stairway are trimmed and wainscoted with white pine, finished natural. The former is fitted up in the most approved manner. The second floor is treated in colors. It contains a large, open hall, three bedrooms, dressing-room, two bathrooms, and large closets. Bathrooms are wainscoted and paved with tilings, and provided with porcelain fixtures and exposed plumbing. Third floor contains three bedrooms and trunk room. Cemented cellar or basement contains kitchen, laundry, furnace, store-room, and other necessary apartments. Messrs. G. E. Harney and W. S. Purdy, architects, 71 Broadway, New York.

Our engraving was made direct from a photograph of the building, taken specially for the SCIENTIFIC AMERICAN.

ALL SAINTS' RECTORY, ORANGE, N. J.

We publish herewith in this issue, on page 25, All Saints' Rectory, at Orange, New Jersey. The design is of the Colonial treatment, with chateau detail. The underpinning and other stonework, where shown, are

A MODERN RESIDENCE AT ERIE, PA.

We present on page 28 a modern residence recently completed for Joseph Frank, Esq., at Erie, Pa. The engraving shows an economical design with many good features, and the lines are well broken, giving it a pleasing appearance. It is built of the best materials, in a thorough workmanlike manner. The building is constructed of rock-faced Cleveland sandstone, laid up in a handsome manner. The roofs are covered with octagonal cutslates. Dimensions: Front, 33 ft.; side, 58 ft., not including piazza. Height of ceilings: Cellar, 7 ft. 6 in.; first story, 10 ft.; second, 9 ft.; third, 8 ft. 6 in. Vestibule is paneled in oak. Reception hall is trimmed with oak, and it has a pleasant nook, an open fireplace trimmed with a tiled hearth and facings, and an elaborate, carved mantel. Hall is wainscoted in panels. The staircase is separated by an arcaded effect, with newel posts extending to ceiling. It is lighted with stained glass effects. Parlor is trimmed

paneled divan. The second floor is trimmed with whitewood. It contains four bedrooms, dressing-room, two bathrooms, and two servant bedrooms, with private hall and stairway. The bathrooms are furnished with exposed plumbing and porcelain fixtures. One bedroom on third floor. Cemented cellar contains furnace, laundry, and other apartments. Cost, $9,000. Mr. Frank W. Beall, architect, 825 Monadnock Block, Chicago, Ill.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

sheathed, papered, and then covered with clapboards and shingles. It is painted with a light terra-cotta color, with cream yellow trimmings, and is cut in with a deep red terra-cotta. The roof is slated. Dimensions: Front, 30 ft.; side, 46 ft. 6 in., not including piazza. Height of ceilings: Cellar, 7 ft.; first story, 9 ft.; second story, 8 ft. 6 in.; third story, 8 ft. 6 in. The interior throughout is trimmed with whitewood. The doors have whitewood frames and sycamore panels. The hall is finished natural, and it contains an ornamental staircase, lighted by a stained glass window with good effect. The parlor and sitting-room are finished in cherry, and the latter is provided with an open fireplace, with tiled hearth and facings, and a mantel of excellent design. Dining-room is finished natural, and is fitted up with an alcove for buffet. Kitchen is wainscoted, and provided with a large pantry well fitted up, a closet for ice box, with an outside entrance thereto, and a staircase to cellar and to second floor. The second floor is finished natural, and it contains four bedrooms, large closets, den and bathroom. Bathroom is wainscoted with ash, and is furnished with the usual fixtures complete. There are one bedroom and ample storage on third floor. Cemented cellar contains furnace, laundry and other necessary apartments. Cost $4,200 complete. Mr. James Spargo, architect, and Jones & Hoffman, builders, all of Bridgeport, Conn.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

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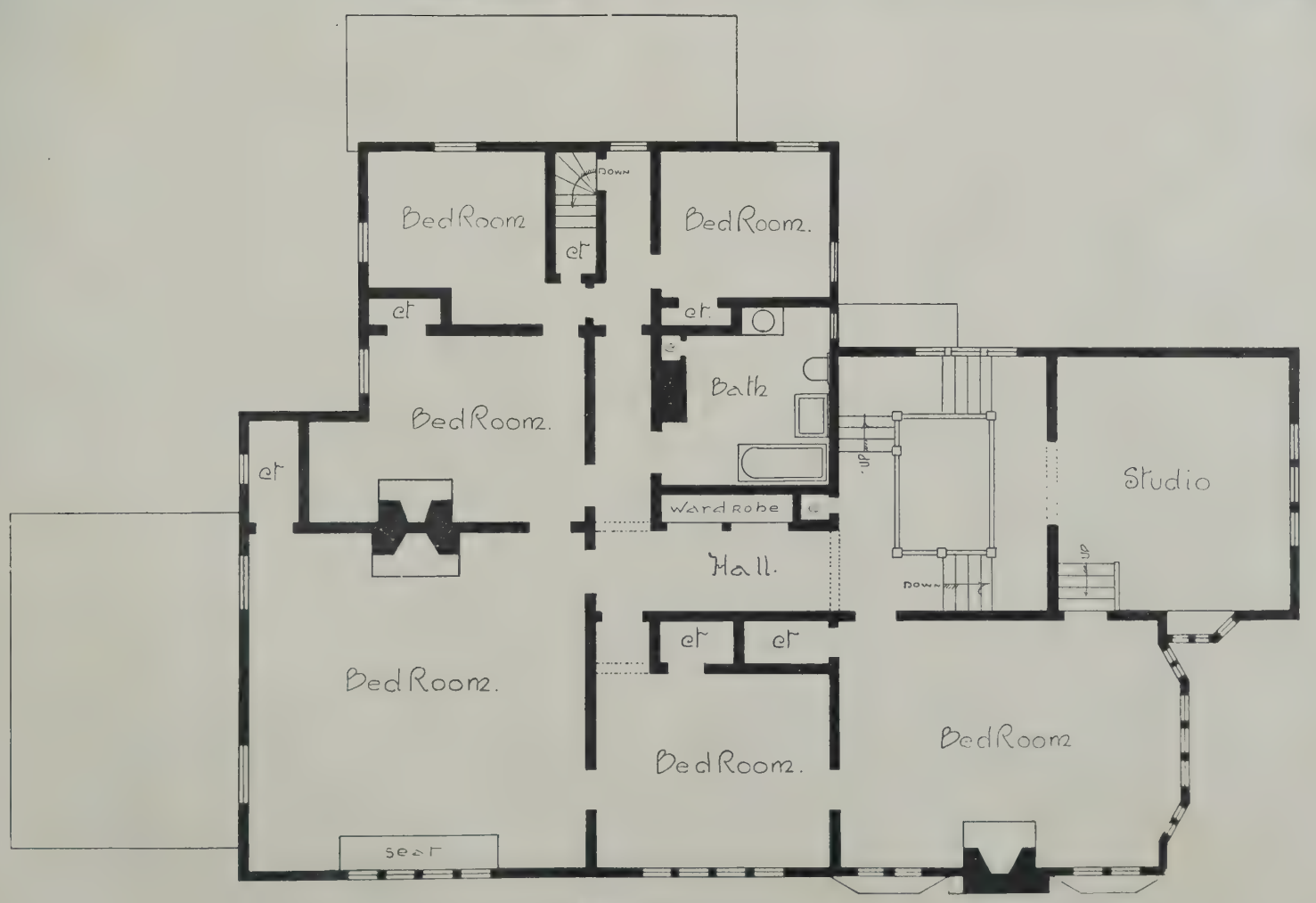
A RESIDENCE AT SOUTH ORANGE, N. J.—See page 20.



Second-Floor.

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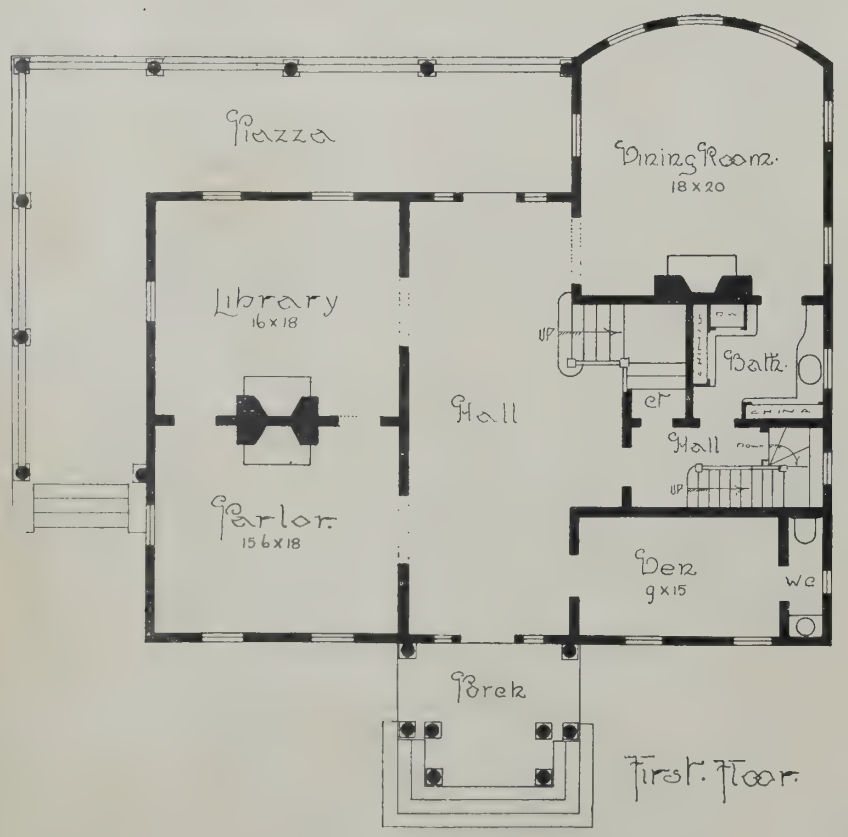
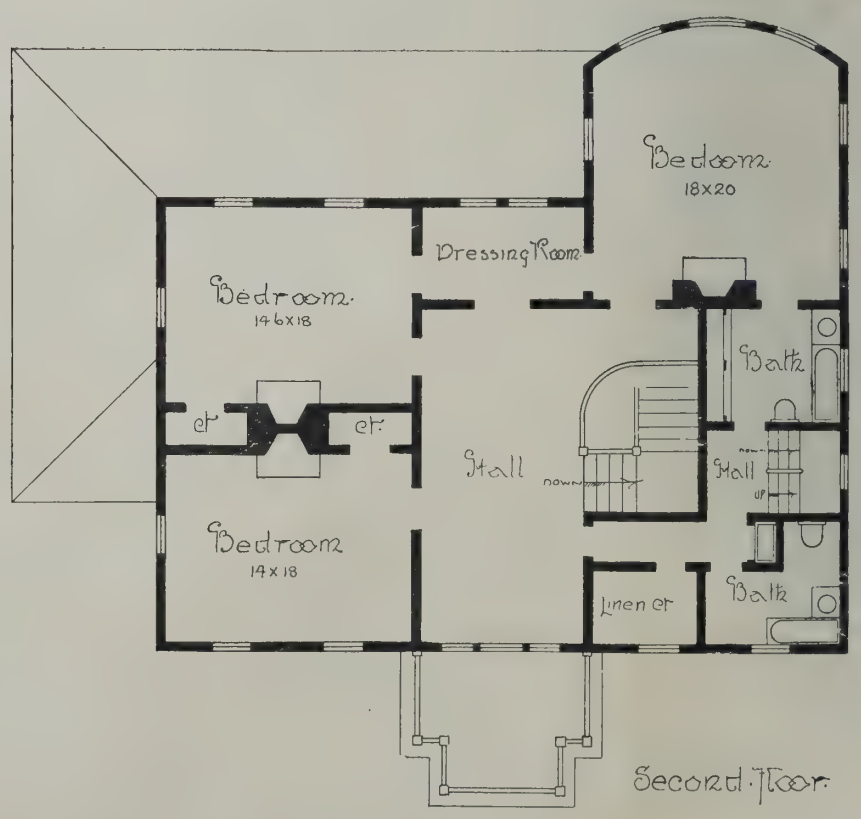
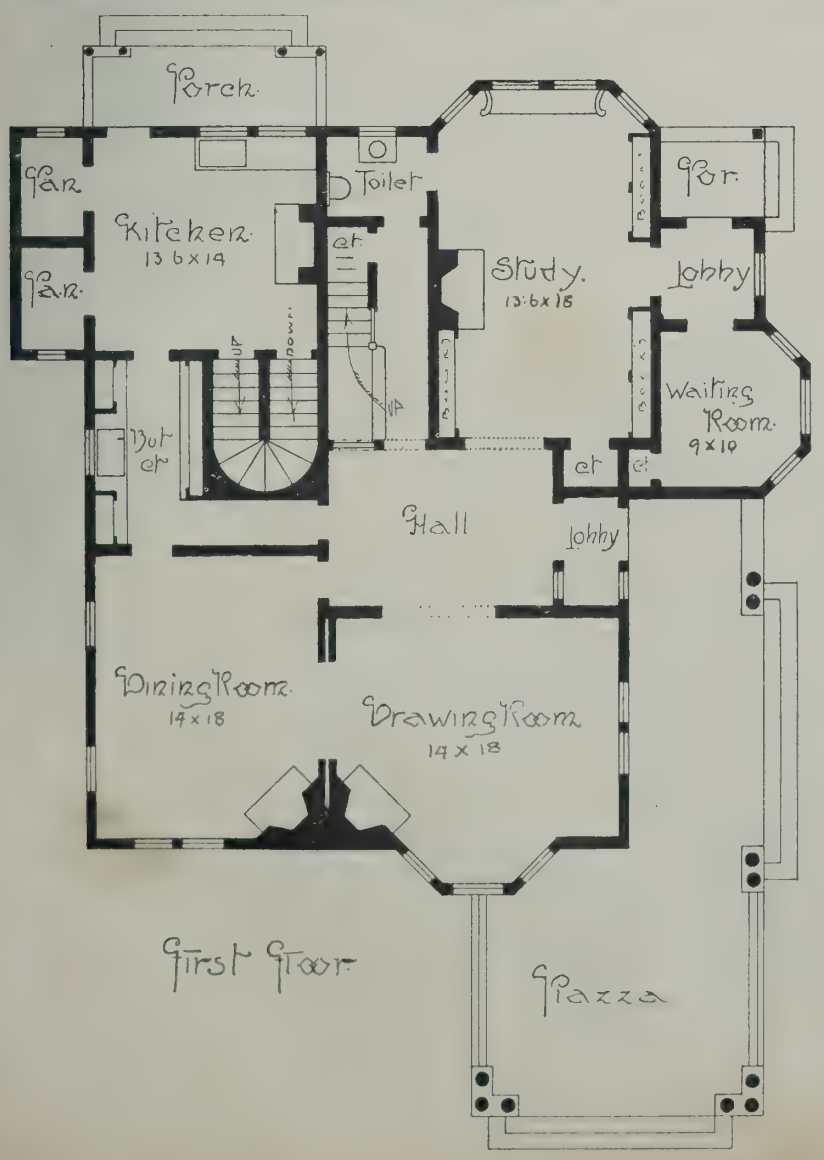
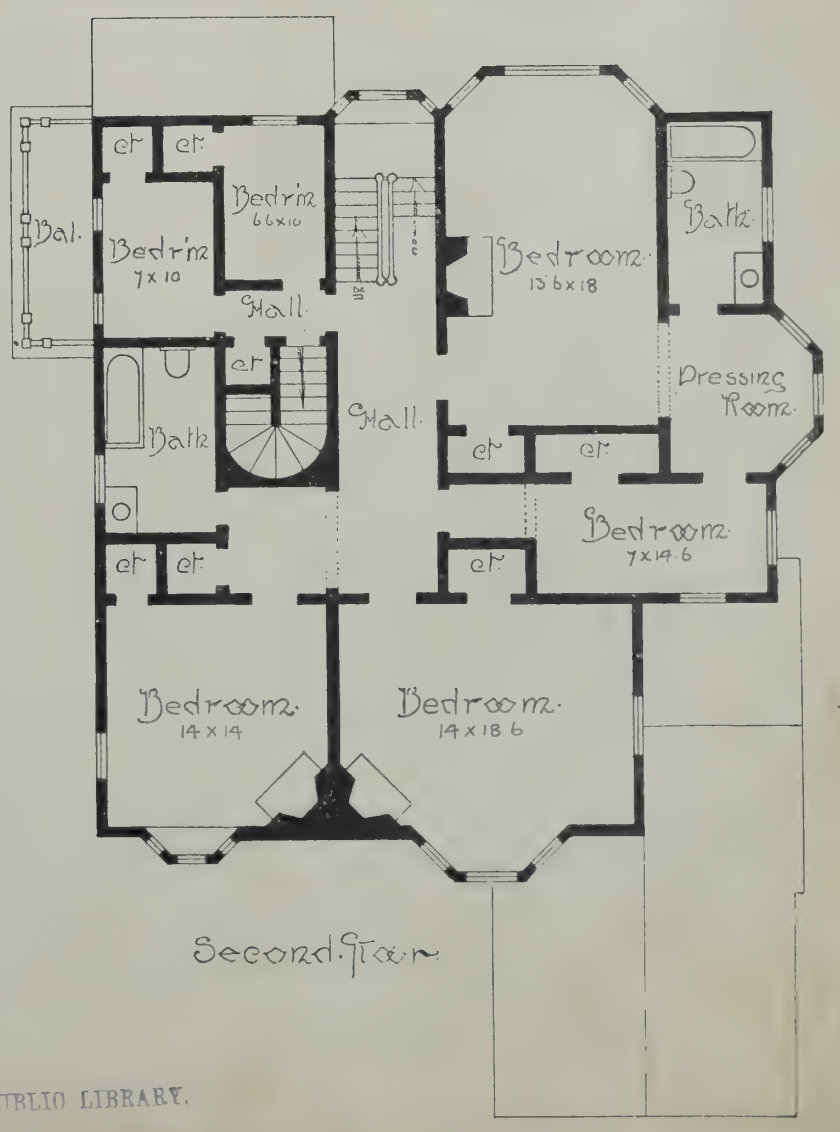




A COLONIAL RESIDENCE AT PRINCETON, N. J.—See page 21.





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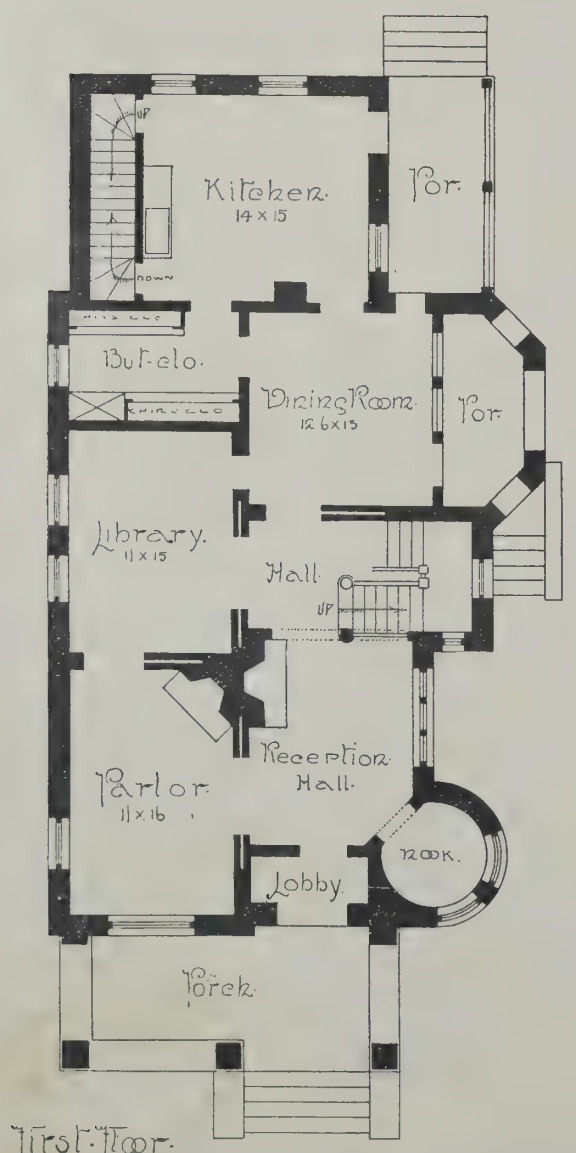
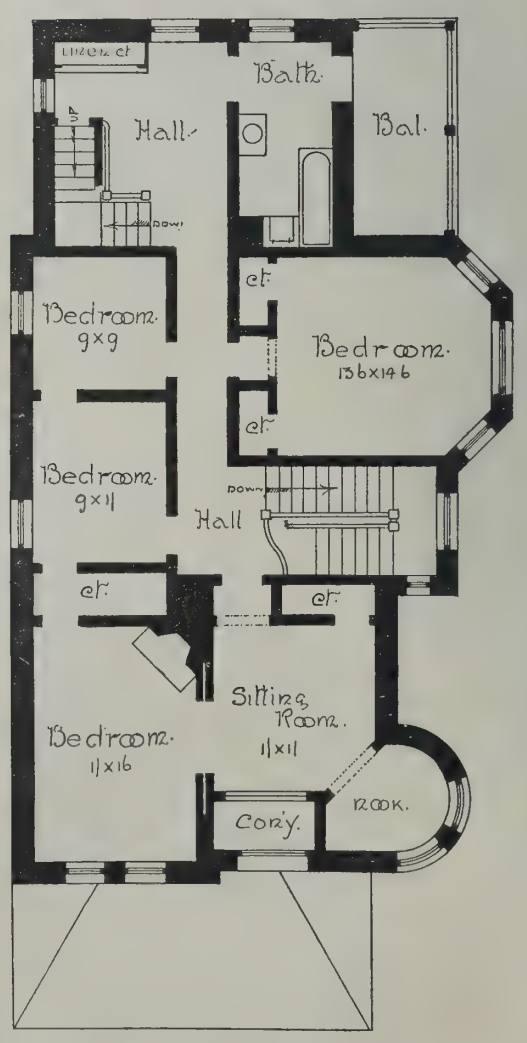
COLORADO COLLEGE, COLORADO SPRINGS, COLORADO.—See page 34.

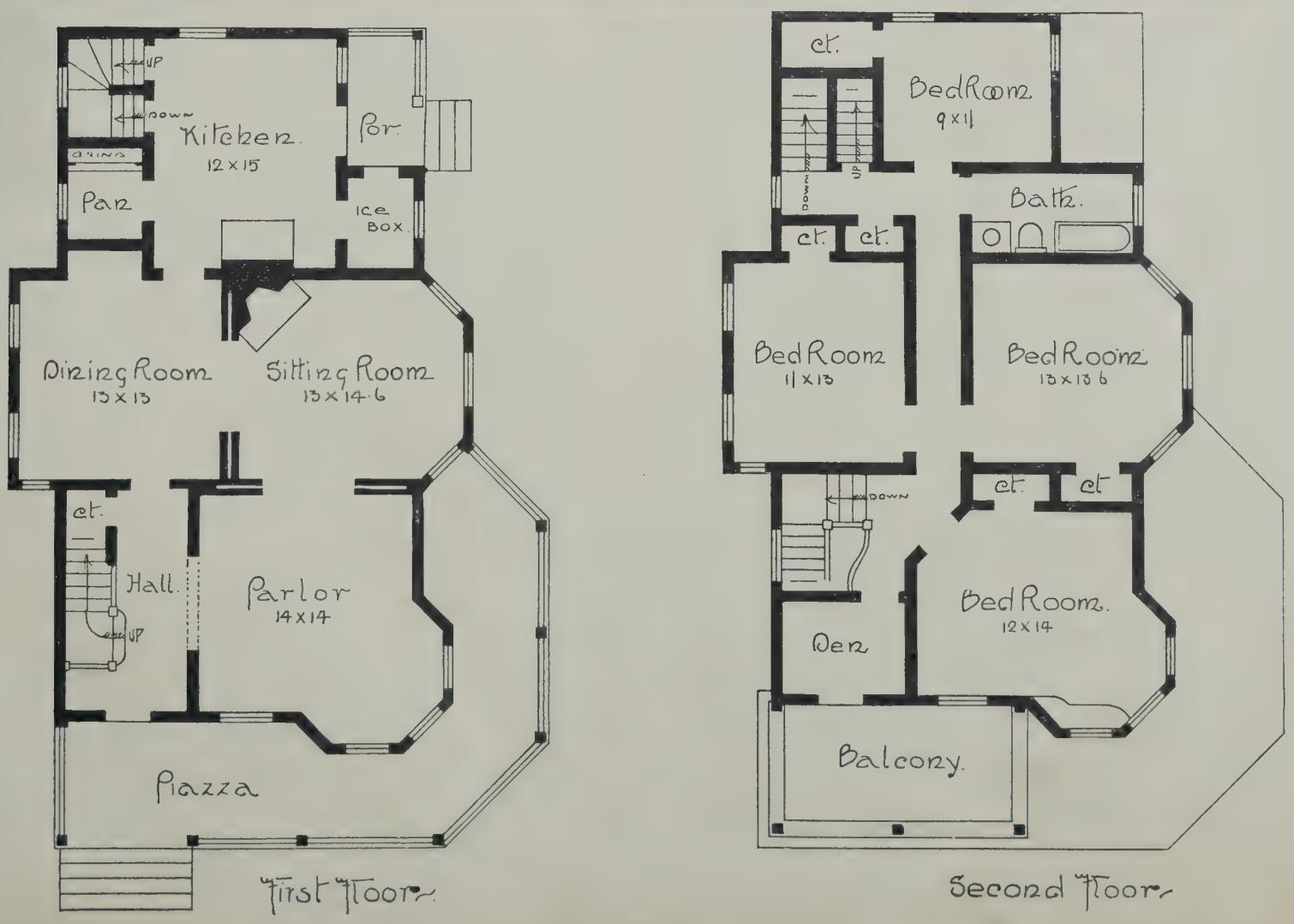
COLORADO COLLEGE, COLORADO SPRINGS, COLORADO.—See page 34.



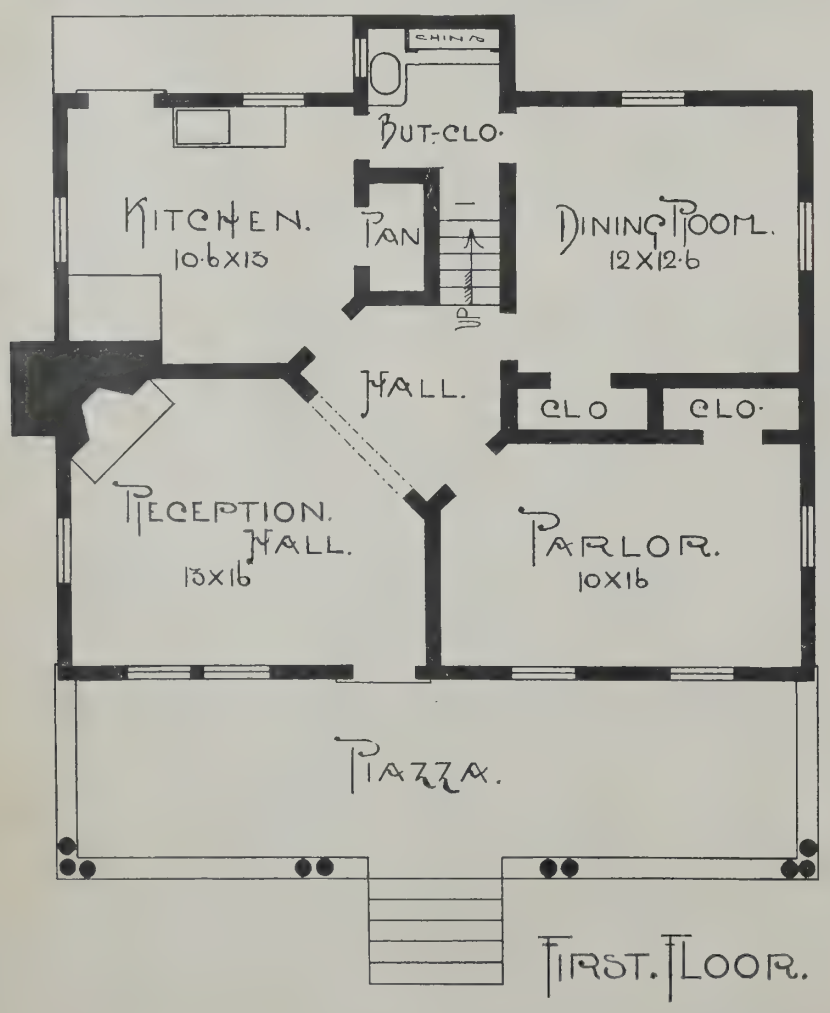


A MODERN RESIDENCE AT ERIE, PA.—See page 21.

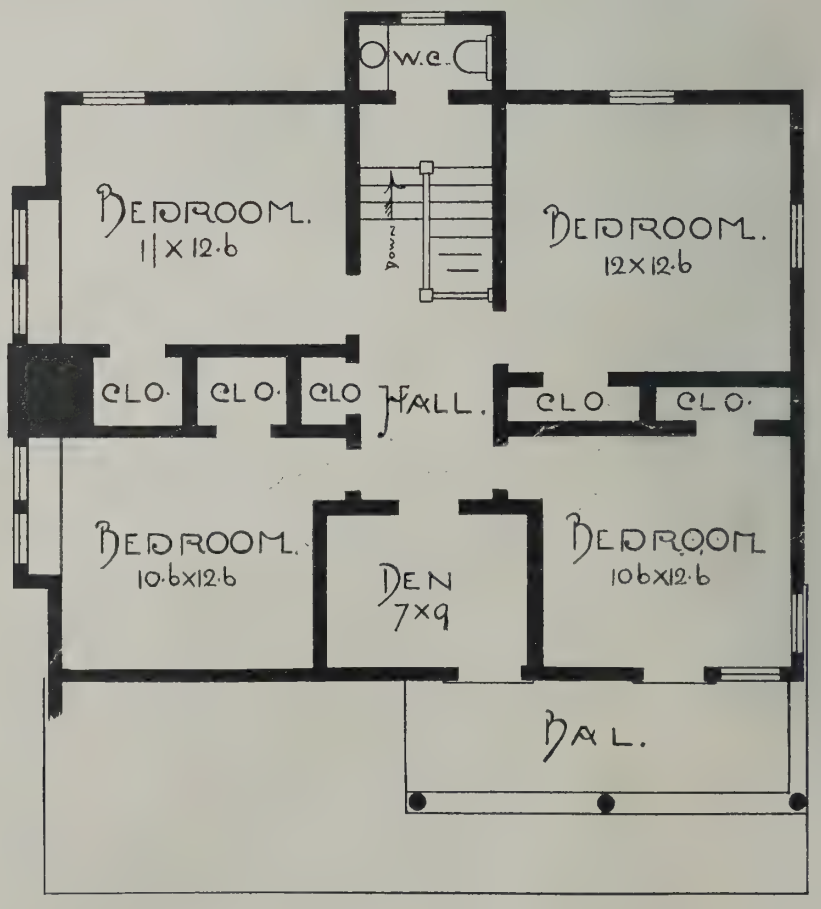
BOSTON PUBLIC LIBRARY.



A MODERN DWELLING AT STRATFORD, CONN.—See page 21.



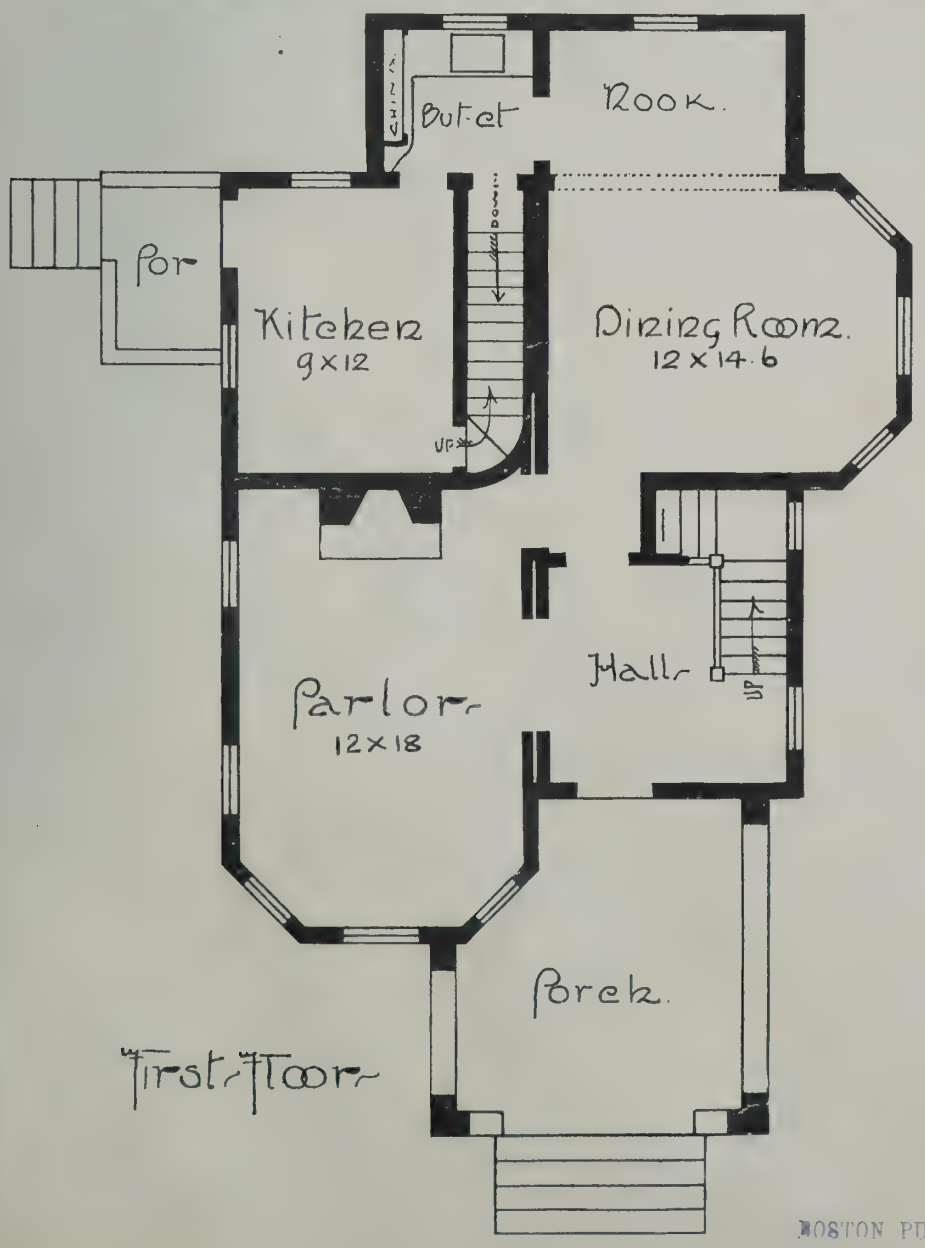
FIRST FLOOR.

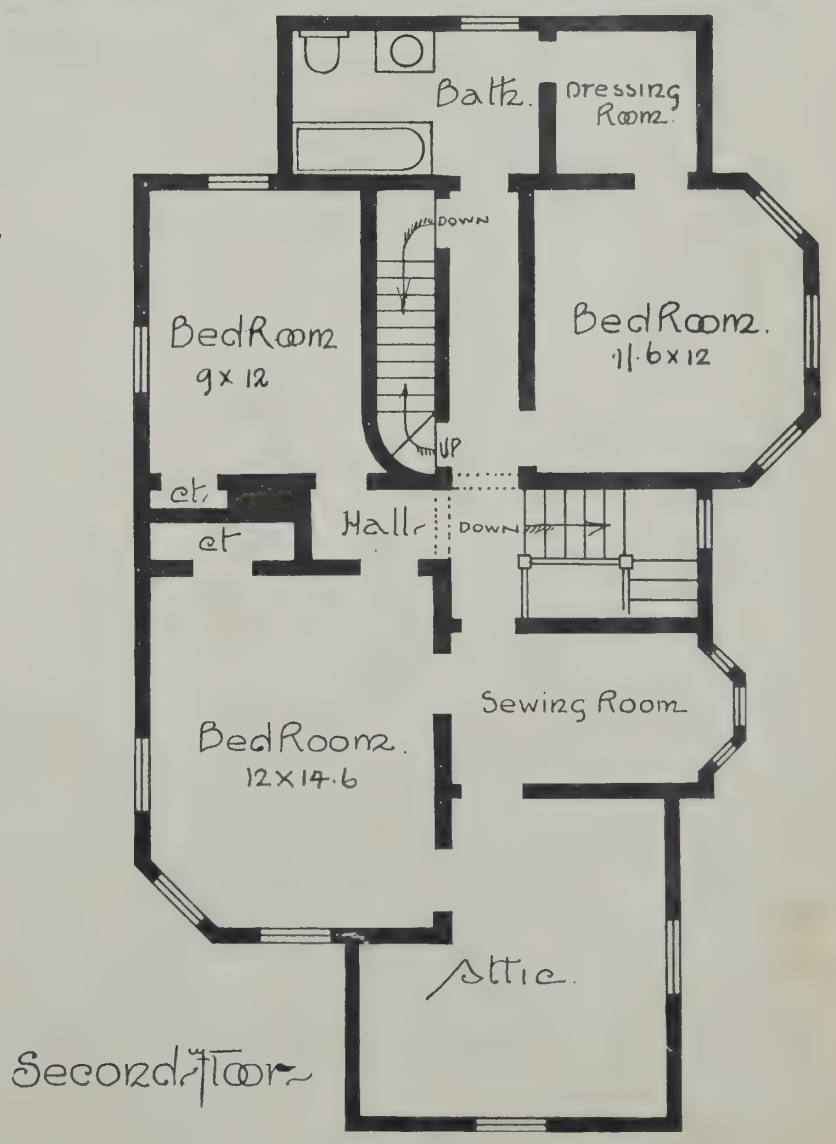


SECOND FLOOR.

BOSTON PUBLIC LIBRARY.

A SUMMER COTTAGE AT CUSHING'S ISLAND, ME.—See page 34.





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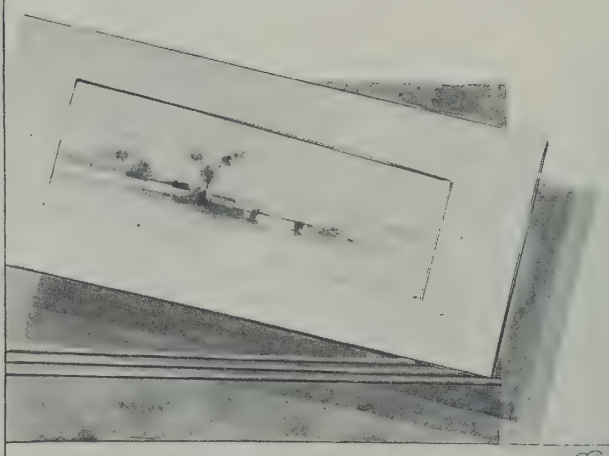
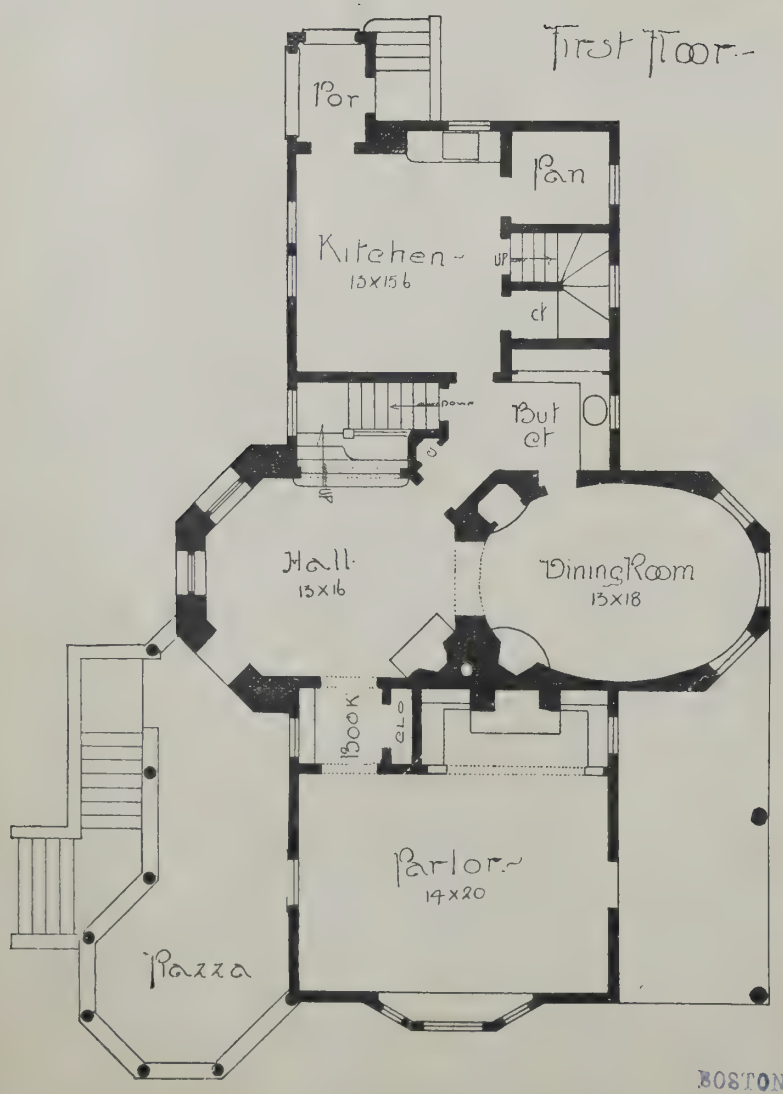
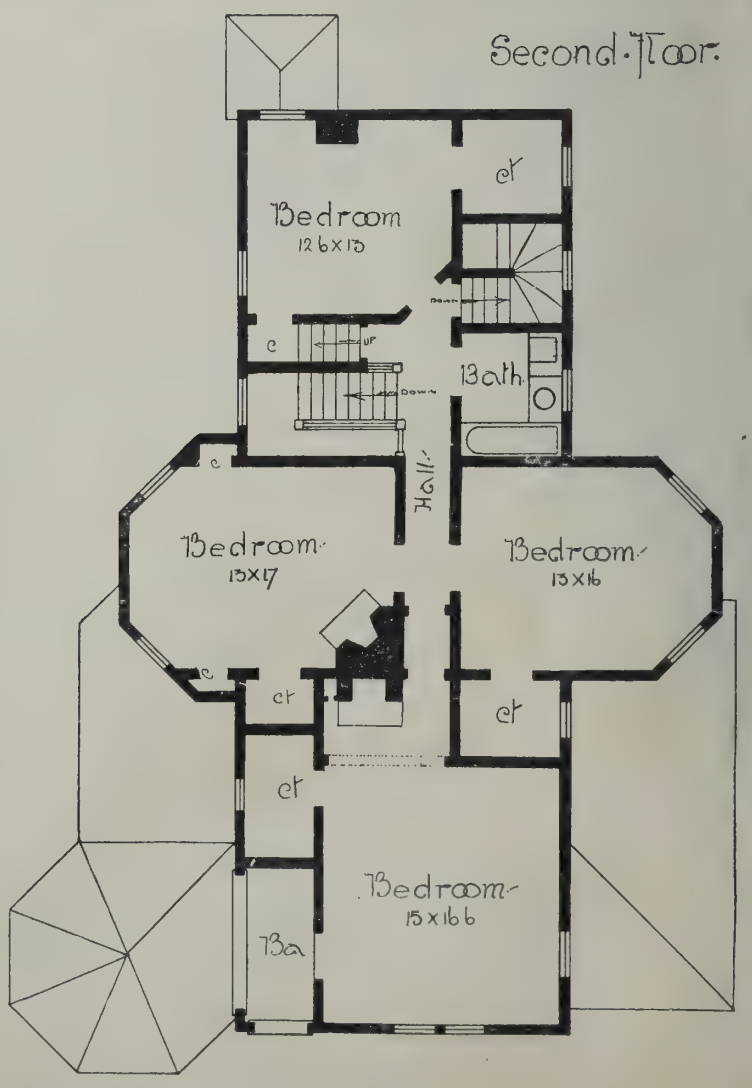
A MODERN DWELLING AT CENTRAL VALLEY, N. Y.—See page 34.







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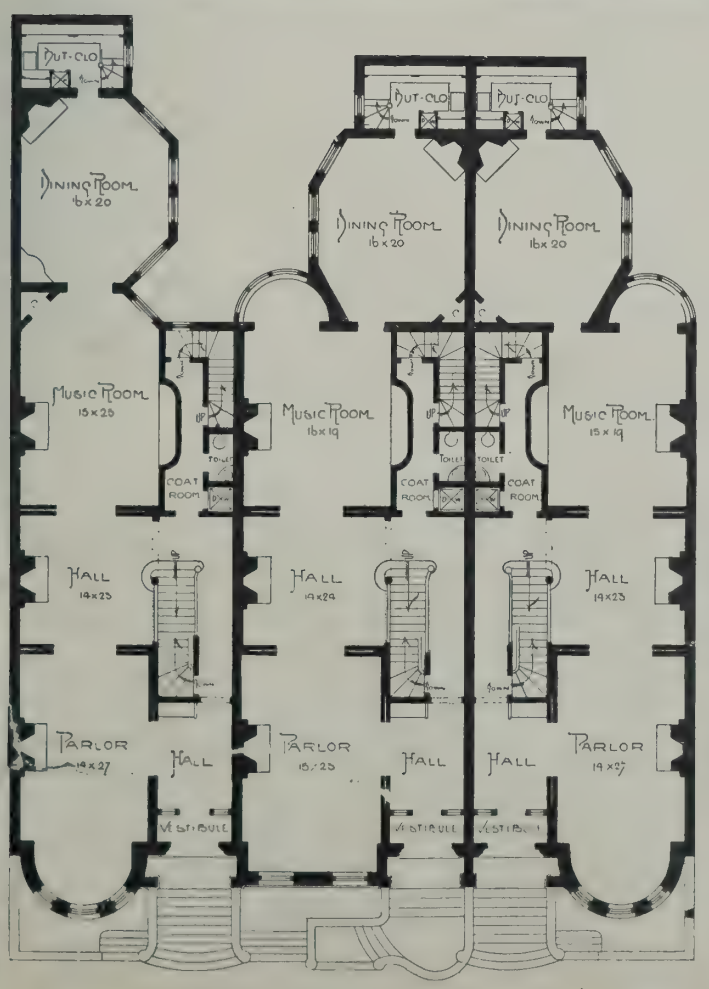
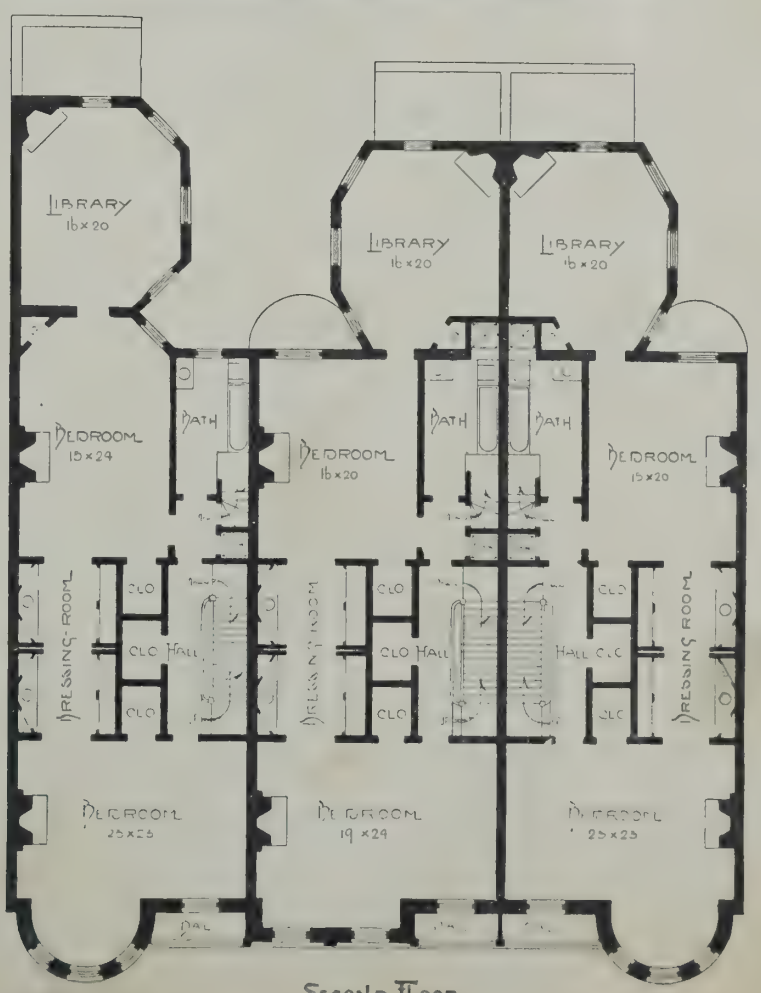
A COLONIAL DWELLING AT LAWRENCE PARK, BRONXVILLE, N. Y.—See page 34.



FIRST FLOOR PLAN



SECOND FLOOR

BOSTON PUBLIC LIBRARY.

TOWN HOUSES ON MANHATTAN SQUARE NORTH, NEW YORK.—See page 34.

TOWN HOUSES ON MANHATTAN SQUARE NORTH, NEW YORK.

The houses presented in the engraving on page 33 have recently been completed for Richard Deeves, Esq., on Manhattan Square North, New York City. The striking features in these houses are the towers and balconies, which are roomy and beautiful in design. The style of architecture used in these houses is the French Renaissance, or chateau, style, which is the most elegant used for fine residences, and by the grouping of the three houses under one design a much more striking and artistic effect is reached than by treating them separately. The front walls are built of Indiana limestone, which is as durable as granite, and particularly suited in color and texture to this style of architecture. The rear walls are built of light colored brick. In point of construction these houses lack nothing which is essential to the stability and comfort of a fine residence. All the headers and trimmers, and the supports under all cross partitions, except where iron beams are placed, are composed of three beams spiked together, and hung in bridle-irons. The hall partitions are carried on 15 in. iron beams in cellar, and 10½ in. iron beams from the stairwell in second story. The floors are doubled throughout, and between them is placed a layer of heavy felt paper for deafening. Parquet floors are laid in the billiard and dining rooms, halls and coat rooms, library and bathroom on third and fourth floors. Billiard rooms and halls in basement are trimmed with quartered oak, and laundries, kitchens, and pantries are trimmed with ash, the latter furnished complete in the best possible manner. Vestibule and halls throughout are trimmed with quartered oak. The front halls and foyer halls have paneled wainscotings and ceiling beams. The staircase is an ornamental one, with columns extending to ceiling, elegantly carved, and provided with balusters, rail, etc. Parlors are trimmed with dark mahogany, and are provided with open fireplaces, furnished with Mexican onyx facings and carved mantels of elegant design. Music rooms are trimmed with white mahogany, and are furnished in the old Colonial style. They are provided with music galleries, which are entered from servants' hallway. Dining-rooms, trimmed with quartered oak, contain fireplaces and sideboards built in. Each dining-room is fitted up with a paneled wainscoting and ceiling beams. Butler's pantries trimmed with similar wood are fitted up replete. The front bedrooms on second and third floors are trimmed with dark cherry, and the remaining bedrooms are trimmed with sycamore, ash, and bird's-eye maple respectively. The dressing-rooms are fitted up with doors glazed with beveled plate mirrors. Bathrooms on second floor are paved and wainscoted with white English tiling. Third floor contains three bedrooms, closets, bath and dressing rooms. The fourth floor of each house contains four bedrooms, dressing-rooms, bathrooms, and store rooms. Heated by steam by indirect radiators. Lighted by electricity. Messrs. Berg & Clark, architects, 10 West Twenty-third Street, New York City.

Our engravings were made direct from photographs of the building, taken especially for the Scientific American.

COLORADO COLLEGE.

We present to our readers in this issue, on pages 26 and 27, a cluster of illustrations showing the Colorado College buildings, at Colorado Springs, Colo. The college was founded in 1874, and is now the leading educational institution in the State, and has achieved a commanding position among the other colleges of the West. It is situated at the northern part of the city, in the midst of a campus of fifty acres, surrounded by the finest residence quarter of the city, and overlooking Pike's Peak and the Rocky Mountain range, and it is owing to this location that it has been made particularly attractive to many young men who have been drawn to it by a consideration of health. The curriculum used at the college is formed upon a skeleton of the methods pursued at Yale and Princeton universities, and since the college has taken rank, so far as its standard of relationship and requirements are concerned, and its similarity to the principles of the colleges of the East, it has attracted many students from all parts of the United States. The influence of the Colorado College is felt throughout the new West, and is the strongest factor in the intellectual and moral life of this new country. The chief executive, President William F. Slocum, a portrait of whom is given on page 26, has been at the head of the college seven years, and its present high standard is largely due to his untiring efforts. Dr. Slocum was born at Grafton, Mass. He prepared for college at the Newton High School, and graduated from Amherst College in 1874. In 1874 and 1875 he was in Germany, pursuing post-graduate courses. He afterwards studied at Johns Hopkins University, and then graduated from the Andover Theological Seminary in 1878. In 1888 he received a call to the presidency of Colorado College, which he accepted, and his able administration of its affairs entitles him to be regarded as one of the leaders in educational lines. Dr. Slocum has a faculty of thirty-two associated with him, and among its members are men known as leading writers and thinkers of rare ability and devotion, who are standing by the college, with its present inadequate facilities, believing in its future, and in the part it is to play in the rapid development of the great empire of the Rockies; men who could not be obtained by the college were it not for the fact that they are obliged to reside in that healthful climate. The perspective view which we illustrate on page 27 shows the plan, and the general arrangement of the college buildings as they will appear when completed. The whole scheme of treatment of the buildings is most excellent. The plan shows a central court, circular in form, and surrounded by the various college buildings, including the chapel at one end of the court, and the dormitories, recitation and lecture rooms, gymnasium, lavatories, library, museums, containing all the facilities for the full development of man, spiritually, physically, and mental. The oldest of the college buildings is Palmer Hall, which is treated in the Gothic style, and constructed of Castle Rock stone. It is named after Gen. W. J. Palmer, one of the warmest friends of the college. The building contains lecture-rooms, laboratories, and the college museum. The most valuable of the college buildings is the Coburn Library, which was presented to the college by N. P. Coburn, Esq., of Newton, Mass. It was erected in 1894, from designs by Messrs. Andrew, Jaques, & Rantoul, of Boston, and at a cost of $50,000. It is treated in the Romanesque style of architecture, and is constructed of peach-blow sandstone, drawn over the mountains, and is probably the most beautiful library building west of Chicago. The floors are of mill construction, and its roof is covered with brown tiling made in Colorado. The interior is very handsomely trimmed and fitted up, and it has a capacity for one hundred and fifty thousand volumes. Another new building of importance is Hagerman Hall, a college residence for young men, and it is named after another patron of the college, Mr. J. J. Hagerman. The building is also treated in the Romanesque style, and is three stories in height. It is built of the red sandstone from near Manitou, with faces left rough as they come from the quarry, and is in quite a pleasing contrast with the low-crowned roof, which is also covered with a reddish brown tile. Montgomery Hall, which we also present in the illustration, is a college residence built for young women, and was a gift by the women of Colorado. It is constructed of Castle Rock stone. The gymnasium, which is fitted up with all the modern apparatus, dressing-rooms, with hot and cold water, shower baths, and every convenience for physical development, was built with funds largely secured by the students. The Wolcott Astronomical Observatory, together with its telescope, was the gift of Henry Wolcott, Esq. It contains a large lecture-room for recitations and scientific lectures, and was designed by Andrew, Jaques & Rantoul, architects, Boston, Mass. A small house in the rear of Hagerman Hall is the "Students' Club," where a boarding club is maintained for the purpose of reducing the cost of the living expenses. The substantial stone residence on the campus is the home of the president. All the buildings are heated by steam, conducted to them from a central plant, through pipes packed with mineral wool. The college has invested in its entire plant $635,000, of which $176,000 is an endowment. Probably there is not a college in the country doing so much work on so small an endowment, and the severe problem now confronting the trustees is how to increase this sum and to keep pace with the increasing demands made upon it.

A COLONIAL DWELLING AT LAWRENCE PARK, BRONXVILLE, N. Y.

We publish herewith, on page 32, a residence recently completed for Albert Stratton, Esq., at Lawrence Park, Bronxville, N. Y. The engravings show a design with pleasing elevations, well broken by an octagonal piazza, balcony, bay windows, and a well arranged plan, handsomely finished, and fitted up complete. The underpinning and all stonework where shown are built of rock-faced stone, laid up at random. The building above, of wood, is covered on the exterior with shingles, left to weather finish. The trimmings are painted white. The roof is shingled, and finished similar. Dimensions: Front, 64 ft.; side, 38 ft., exclusive of piazzas. Height of ceilings: Cellar, 8 ft.; first story, 9 ft. 6 in.; second, 9 ft.; third, 8 ft. 6 in. The interior throughout is trimmed with whitewood. The hall and parlor are treated in China white. The former is provided with a broad, low staircase, with carved newels, and a window, glazed with delicate tinted glass, shedding a soft and pleasant light over upper and lower halls. The fireplace is built of brick, with hearth and facings of same, and a neat mantelshelf. The nook, between this hall and drawing-room, is provided with a coat closet and a bookcase. The drawing-room is well lighted and ventilated, and it contains an ingle, with an archway as a dividing line. This ingle contains paneled divans and an open fireplace, with bookcases built in on either side. The fireplace has a tiled hearth and facings, and an artistic mantel. Dining-room is treated in a dark olive green color. It is oval in shape, and very artistic in finish. The china cabinet is fitted up with leaded glass doors, and the fireplace has tiled trimmings and mantel to correspond with the treatment of the room. The floors are laid with oak. The pantries and kitchen are wainscoted with narrow beaded stuff, and are furnished with the best conveniences respectively. The second floor is treated in China white, and it contains four bedrooms, large closets, and bathroom. The latter is wainscoted, and furnished with all the necessary fixtures complete. There are three bedrooms and trunk room on third floor. Cemented cellar contains laundry, furnace, and other apartments. Cost $6,500 complete. Mr. William A. Bates, architect, 149 Broadway, New York.

Our engravings were made direct from photographs of the building, taken specially for the Scientific American.

A MODERN DWELLING AT CENTRAL VALLEY, N. Y.

We present herewith in this issue, on page 31, a modern dwelling-house recently erected for George Cornell, Esq., at Central Valley, N. Y. The building has some good features, including a well-shaded piazza, bay window and tower. The underpinning is built of brick laid up in red mortar. The exterior framework is sheathed, papered, and then covered with clapboards and shingles. The clapboards are painted yellow, with white trimmings, and the shingles are stained mahogany color. The roof is shingled and painted red. Dimensions: Front, 28 ft. 6 in.; side, 38 ft., not including piazza. Height of ceilings: Cellar, 7 ft.; first story, 9 ft.; second, 8 ft. 6 in.; third, 8 ft. The interior throughout is trimmed with yellow pine, and is finished natural. The hall contains an ornamental staircase, turned out of similar wood, and it is lighted by a stained glass window. The parlor is a spacious apartment, and is provided with an open fireplace, furnished with tiled hearth and facings, and mantel of good design. Dining-room, well lighted, is provided with a nook, large enough to be used for luncheon. Kitchen and pantry is wainscoted with narrow beaded stuff, and fitted up with the usual necessary fixtures replete. The second floor contains three bedrooms, bathroom, dressing and sewing rooms, closets, and attic over front porch for storage. Third floor is unfinished, but several bedrooms could be finished off if desired. Bathroom is wainscoted and fitted up replete. Cemented cellar contains laundry, furnace, and other necessary apartments. Cost $3,000 complete. Mr. E. W. Edwards, architect, Central Valley, N. Y.

Our engraving was made direct from a photograph of the building, taken specially for the Scientific American.

A SUMMER COTTAGE AT CUSHING'S ISLAND, ME.

We publish herewith, on page 30, a cottage recently erected for Francis Cushing, Esq., at Cushing's Island, Me. The design presents a unique example for a summer home, containing pleasing elevations, well shaded piazza and balcony, and an interior arrangement conveniently fitted up. The building is erected on cedar posts, with stone footings. The cellar is ceiled up with narrow beaded stuff, and it has an outside entrance thereto. The building above this is sheathed and then covered with shingles. It is painted a dull shade of olive green, while the roof is shingled and painted red. The columns at piazza and balcony are turned out of rough cedar posts, dressed and finished natural. The chimney is a feature in itself, and is built of rock-faced stone laid up at random. Dimensions: Front, 33 ft. 6 in.; side, 29 ft. 6 in., not including piazza. Height of ceilings: First story, 9 ft.; second, 8 ft. The interior throughout is trimmed with spruce, finished natural. The walls and ceilings are not plastered, but are left with the beams exposed to view. These beams are dressed and finished natural. The reception hall is provided with an open fireplace, built of brick, with hearth of same, and a neat wood mantel. It is separated from staircase hall by an archway. The staircase is fitted up with ornamental newels, balusters, and rail. Parlor is well lighted. Dining-room is provided with a large butler's pantry, with shelves, drawers, and cupboards. Kitchen is wainscoted and furnished with the usual fixtures. Second floor contains four bedrooms, den, and toilet; the latter complete. Cost $1,950 complete. Mr. John Calvin Stevens, architect, Portland, Me.

Our engravings were made direct from photographs of the building, taken specially for the Scientific American.

Miscellaneous Notes.

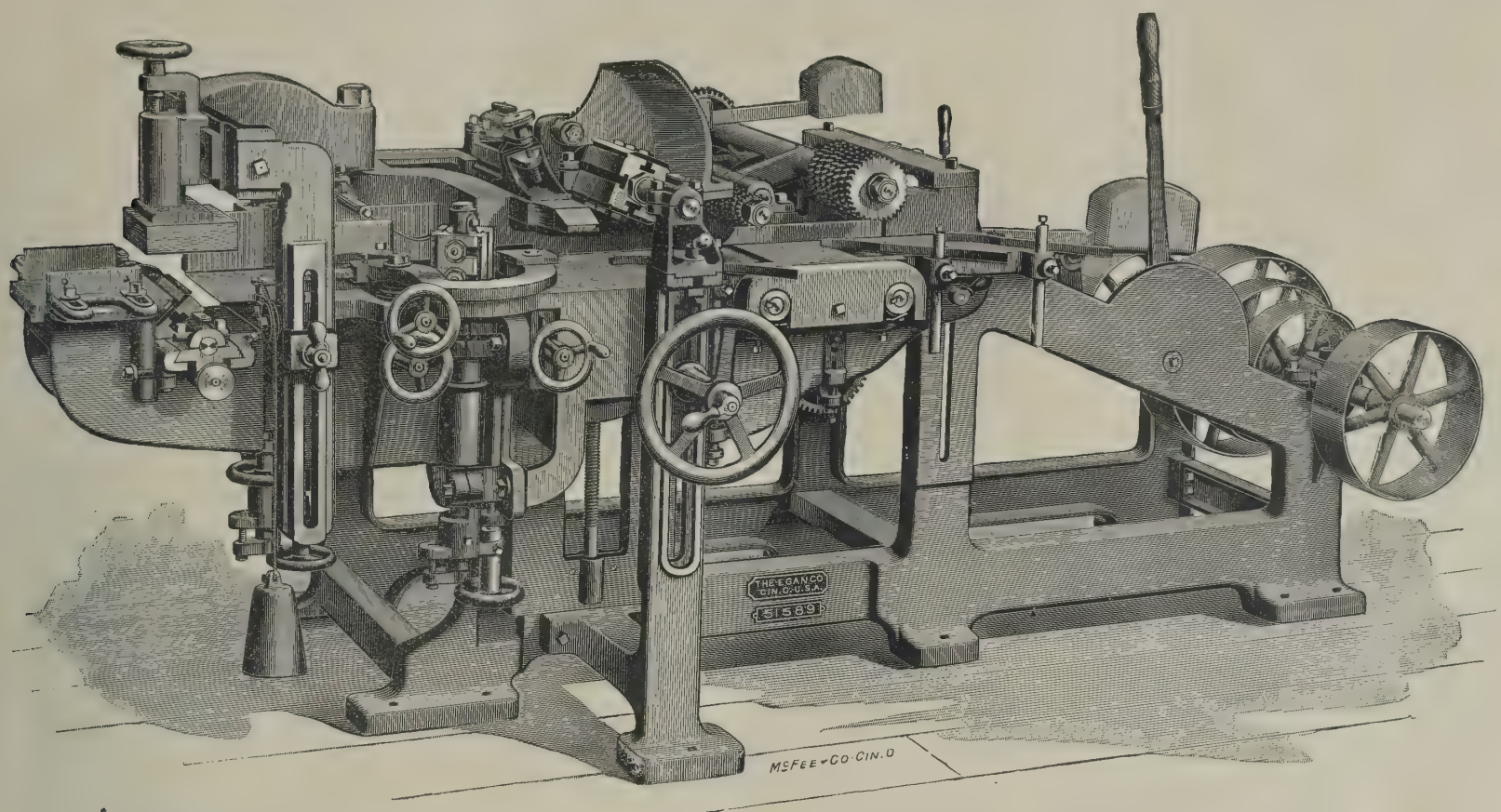
It has been suggested that the boards of health of large cities require the wheels of all milk wagons to be equipped with rubber tires.

A car load of redwood was recently sent to Nuremberg, Germany, for use in making lead pencils. California redwood and cedar are about the only woods used in the manufacture of pencils, and the European forests, from which the pencil wood supply was formerly obtained, have become exhausted.

The Albert Levy prize, of the value of $10,000, has been awarded by the Academy of Medicine to Drs. Behring of Berlin, and Roux, sub-director of the Pasteur Institute in Paris, for their discovery of the means of curing diphtheria.

IMPROVED WOOD-WORKING MACHINERY.

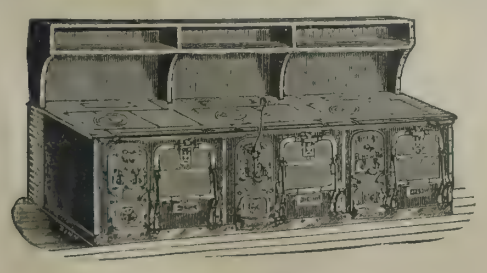
The improved heavy "Standard" seven-inch four-sided moulder, shown in this illustration, is heavier and more solidly constructed even than other so-called "standard" moulders, enabling it to stand up to work in better shape, and to be comparatively free from vibrations. The frame is so designed that the belts clear each other perfectly, so that friction, wearing out of belts, heating of boxes, etc., are overcome. The frame is very long, giving more than ordinary length of belts. There is also plenty of room to get at the various parts of the machine. The main spindle is extra large in diameter, of the best crucible cast steel, and runs in self-oiling boxes, lined with Babbitt. The outside bearing extends to the floor, and is bolted to the frame at the base of the machine, so as to really make it a portion of the frame. The lower head has independent vertical and lateral adjustments. Each side head is independently adjustable vertically and laterally, and these adjustments made without stopping the machine, and even while stock is going through. Either side head can also be adjusted to an angle independently, and, when so adjusted, they are supported and locked in position at both ends. Both side heads and the lower head are supported on the bed, and rise and lower with the bed. The table is raised and lowered by an improved device, which relieves the operator of any unnecessary exertion, and makes it possible to raise and lower the bed by applying but a single hand to the hand wheel. The pressure foot over the lower cutter head is braced to the bed, thus bringing the stock to an even thickness. The arm that carries this pressure foot is made so that the pressure foot can be instantly swung out of the way, giving free access to the lower cylinder, and that portion of the bed outside the lower cylinder is also hinged so that it can be swung away, exposing the cylinder for setting and adjusting the knives. There are four large driven feed rolls, two above and two in the bed, all geared in a powerful manner, and the table can be dropped full 16 inches, so as to take in the very widest baseboards. For further particulars address the manufacturers, the Egan Company, 209-229 West Front Street, Cincinnati, Ohio, U. S. A.



A NEW SEVEN-INCH STANDARD FOUR-SIDED MOULDER.

AN EFFICIENT RANGE.

The illustration represents a range made by Messrs. Clad & Sons of No. 121 South Eleventh Street, Philadelphia, Pa., which has attained a high reputation for

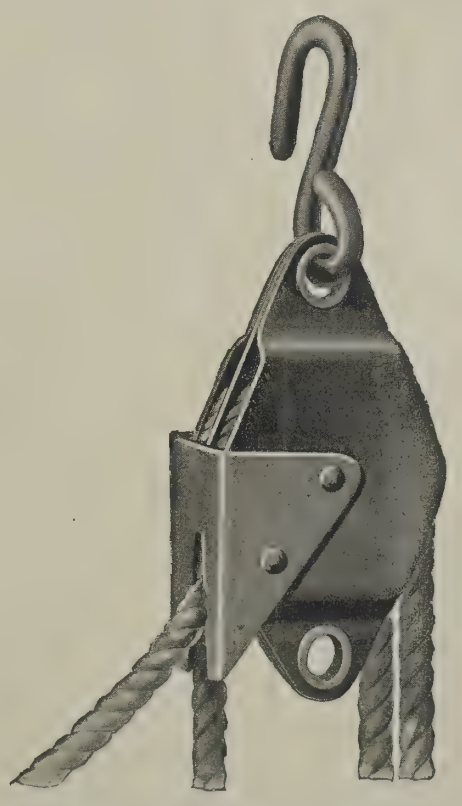


CLAD'S FRENCH RANGE.

efficiency and durability. It is made of wrought steel, and is therefore better, stronger, and more durable than cast iron ranges, though costing but little more. It will roast, bake, and cook quicker, and is also handsomer and more convenient. It requires less attention, takes less fuel, and there is no trouble with the cracking of oven plates, and the leaking of ashes, dust, or soot into the ovens. The ovens and the flues are also proportionally larger. The ovens have drop doors, which are not liable to break under any circumstances, and the range will do good service for a lifetime.

A SMALL AND EFFICIENT TACKLE BLOCK.

Little devices which lighten labor and enable one person to do the work of two have only to be brought to notice to be appreciated. Under this head comes Lane's "Junior" tackle block, made by Lane Brothers, manufacturers of hardware specialties, Poughkeepsie, N. Y. It is a lighter block than their regular line, taking three-



"LANE'S JUNIOR" STEEL TACKLE BLOCK.

eighths rope or smaller cord. The case is of steel, heavily coated with tin, the hook is also steel, and there is no malleable iron in the make up of the block. The steel

SHEAVES FOR TACKLE BLOCKS.

insures lightness with strength, and destructive tests have shown that the rope will part before injury comes to the block. Added to the above good features, the self-locking device is perhaps still more valuable. The fixture is exceedingly simple, and enables the operator when raising a load to lock it at any point. This is done in an instant by merely a jerk of the hauling rope or cord, and it may be unlocked with equal facility, doing away with all necessity of tying the hauling rope or cord, and the load is held surely up to the strength of the rope sustaining it. The device is shown in the illustration, with the series of blocks, five in number, which may be used separately or in connection with each other. Each kind being packed in a separate box, they are a convenient thing for the dealer to handle. They are a handy article to have about every household, also for tents, awnings, and on board yachts and sailing craft, for clothes-lines, telegraph and telephone line work, etc.

SELF-CLOSING GATE.

The gate illustrated by the accompanying cut is very simple in construction, and possesses many advantages, while its appearance is distinguished by great neatness of finish. The two special features which give it prominence as a self-acting gate are the construction of the latch, and that of the hinges. The latch comprises a casing, with a latch member pivoted thereto, said member being approximately of ∩ shape. When the gate swings to, one of the ends of the latch strikes a keeper on the gate-post, so as to raise the latch until its other end is engaged by the keeper. This stops the closing

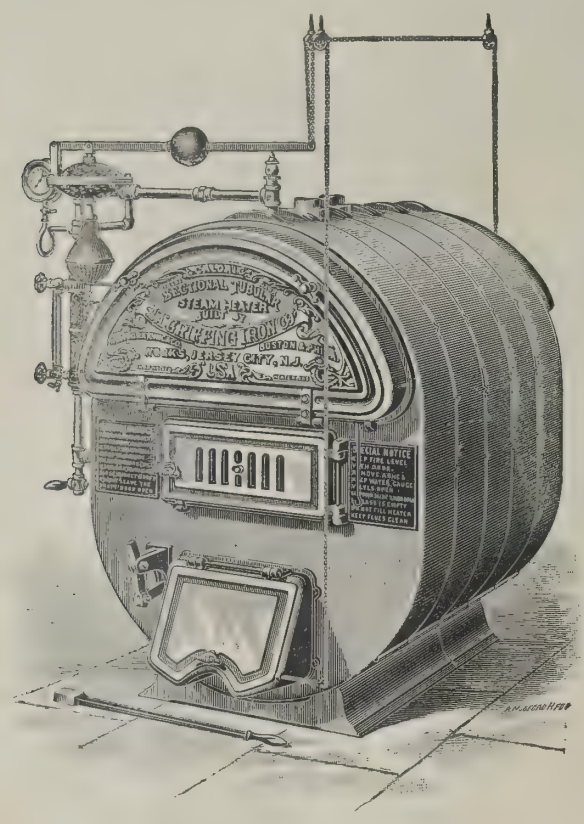
SELF-CLOSING GATE.

movement of the door, and the keeper remains between the two ends of the latch. The lower hinge is made with two pintles, and two eyes or seats, and the door during its movement swings alternately on one or the other of the pintles as a pivot. The lower pintles are so arranged relatively to the uppper hinge that gravity will cause the gate to shut itself. This gate is manufactured by Burr & Houston Co., 31-37 Franklin Street, Brooklyn, N. Y.

THE Electro-technical Institute of Darmstadt, Germany, has received about $100,000 from the government for the purchase of new ground and for the enlargement of the buildings.

"CALORIC" SECTIONAL TUBULAR HEATERS.

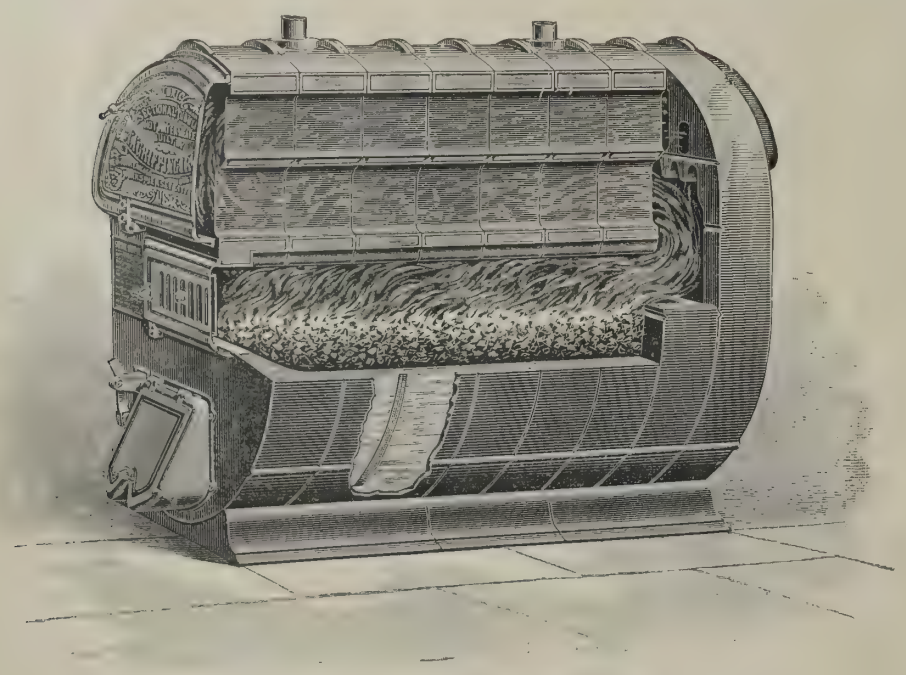
This steam and water heater presents a radical departure from the beaten path previously trod by the other manufacturers of heaters. Among its essential features are its elliptical-shaped sections, the lower part forming the ash-pit, and the gas-burning door, which is particularly convenient on account of its large size, affording great facility for cleaning out, for, by the opening of the large door of the front smoke hood, every flue is exposed for thorough cleaning with the flue brush. Another advantage claimed for this heater is the ease with which it can be set up. The sections can be easily rolled from place to place, for they are elliptical in shape, and the sections are assembled on the base, without the necessity of building an extra foundation. The connections are made iron to iron, and of liberal size, being six inches at the top and four inches at the bottom for the larger size. Two sizes of sections, that build up heaters 60 and 52 inches total height respectively, make available heaters ranging in capacity



"CALORIC" HEATER OF THE A. A. GRIFFING IRON CO.

from 425 to 5,000 square feet of direct radiation for steam, and from 675 to 7,500 square feet for water. The heaters are low in height, well adapted for low cellars, and are shipped in sections that can easily be passed through narrow doorways. The grate is larger than in most heaters, and this, together with the greater amount of fire surface in the large corrugated crown sheet, the manufacturers claim, makes this heater very effectual, as well as economical in consumption of fuel. The products of combustion pass the entire length of the heater three times. The heater is well adapted for burning either hard or soft coal, or even wood.

The trimmings are of the best quality, and highly ornamental. The automatic regulator is positive and sensitive. No money or pains have been spared in



"CALORIC" HEATER—SECTIONAL VIEW.

making this heater a success. Sections may be added to the heater at any time, without breaking the pipe connections. Each added section increases the size of the grate by two grate bars. The grate bars are of the latest and most approved rocking and dumping type, with liberal openings between for air passage. The heater has been thoroughly tested in every way during the past eighteen months, and the large number that have been put in have all proven entirely satisfactory, and wonderfully economical in point of fuel consumption. Circulars giving further particulars will be furnished by A. A. Griffing Iron Co., 66-68 Centre Street, New York, where the heaters may be seen, as well as at Boston, Philadelphia, and Jersey City.

A RANGE OF ORIGINAL DESIGN.

The beautiful range shown in the accompanying illustration is designed to present a most attractive appearance in any kitchen. It is manufactured by Charles Noble & Co., the Liberty Stove Works, Nos. 420 to 432

THE HOME LIBERTY RANGE.

Brown Street, Philadelphia, Pa., and has a horizontal boiler, with shield and mantel, and all the latest improvements. It has five or six boiler holes, right or left hand ovens, plain or duplex grates, and is made with or without high closet. The range is also made with a vertical boiler.

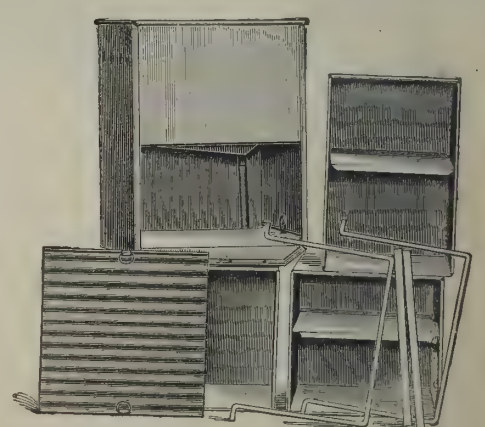
The Inadequacy of Modern Fire Apparatus.

The inadequacy of modern fire apparatus to cope with conflagrations in high buildings has been many times demonstrated within the past year. Lofty metropolitan construction provides an enormous new field for development in fire apparatus, and architects and builders are among those who most earnestly hope for such advances in discovery as will effectually limit the manifold dangers that must be occasionally met in the fires of great cities. Fireproof construction as now approved is a great stride ahead for the protection of humanity and property, but buildings so constructed are nearly always filled with sufficient furniture and other combustible materials to feed the flames. The architects have done all that it is possible for them to do in this direction, and subsequent development is in the hands of the manufacturers of fire apparatus and municipal governments. It is not among the impossibilities that the great buildings of the future will be compulsorily provided with isolated plants for fire protection which will serve the purpose far more effectively than anything yet devised.—*Architect, Builder and Decorator.*

THE late lamented John Stewardson, a Philadelphia architect of great promise, is quoted in *Lippincott's Magazine* as having concluded that there was to be a revival of a Classic style in this country: "Surely a new light is breaking. The mass of young draughtsmen and students that are enthusiastically studying the principles of design as taught in the Classic schools are getting a knowledge of the three cardinal points which it is the boast of that school to teach—planning, proportion, and profile—and that knowledge will go far to raise the standard of our civic architecture in the beginning of the twentieth century infinitely above what we are used to to-day. To resume, then, we have seen that our country houses are developing a style in harmony with the exigencies of the climate and the needs of the people, and are often beautiful besides; that architecture is not necessarily absent from our business buildings, and that the need of skilled design is felt more and more in those devoted to public use. Is it not almost a certainty that, with the future development of studious academic architecture throughout the country, there is coming a wave of Classic that will have nearly as much influence over the American style as it has had for centuries over Europe? And is it not fair to assume that the fearless vigor that has marked our modern work, both good and bad, is going to give a distinction to the style of the twentieth century in America that will set it apart from that of the rest of the world?"

AN UP-TO-DATE REFRIGERATOR.

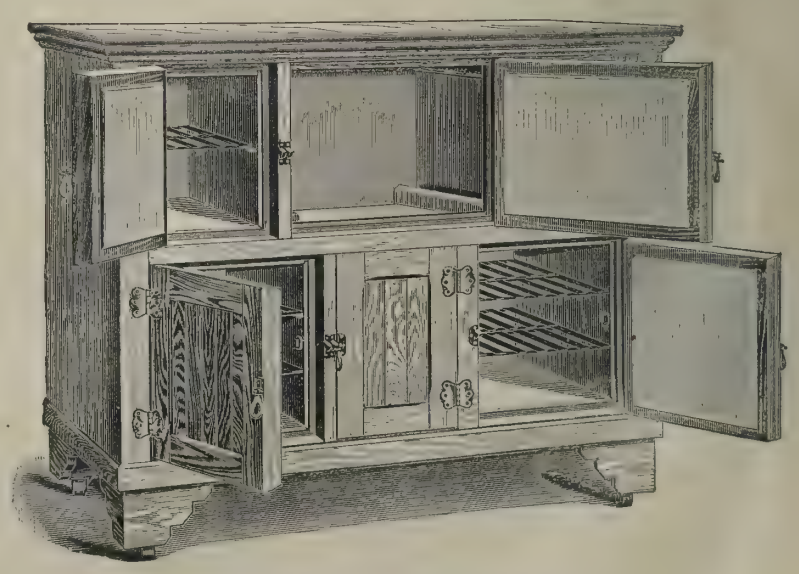
We show herewith two views of the hygienic refrigerator. One is that of a large size for family use, and has five entirely separated and removable compartments for food, besides a compartment for ice. In this refrigerator can be kept meats, fish, milk, cream, and butter, fruits, flowers, besides vegetables, and all so kept apart that no one will be tainted by the other. This is one reason why the refrigerators are named "hygienic." The other view shows the compartments taken from another style, as they would be when removed for cleaning, illustrating their construction and how perfectly they are separable from each other. When in place within the body of the refrigerator, the cold air from the ice circulates around



HYGIENIC REFRIGERATOR—PARTS.

them, the interior of each being cooled by conductivity. The compartments being removable as well as the drain pipe, is another reason why they are called "hygienic." This enables them to be easily, cleaned and put in the sun and air to sweeten.

The outside or walls are very substantially constructed, the exterior being beautifully finished in hard wood. Their simplicity of finish is in itself attractive and clean looking. Though only on the market a little over two years, they have won the approval of experts, such as dealers and those interested in household economics and hygiene, as well as cooking school teachers. They received the highest award at the Atlanta Exposition, and were commended by a special vote of the ladies on the Board of Managers of the Women's Department, by whom



THE HYGIENIC REFRIGERATOR.

they had been selected and used throughout the Exposition, as being models of the most advanced method of constructing refrigerators. They are manufactured by the Hygienic Refrigerator Company, of Boston, Mass.

THE *Chemiker Zeitung* states that according to Max Hagen the smoke of wood fires is not in the slightest degree injurious to vegetation.

SCIENTIFIC AMERICAN.

Building Edition.

A SUMMER HOUSE AT DAYLESFORD, PA.

No 131. SEPTEMBER 1896.

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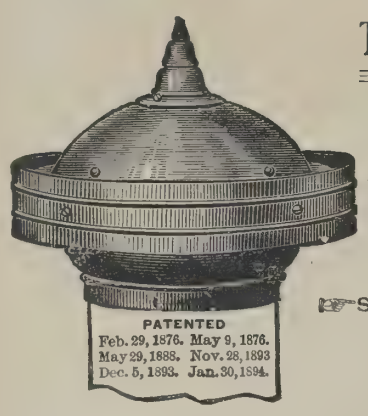

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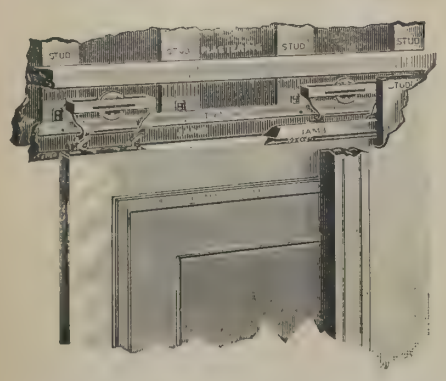

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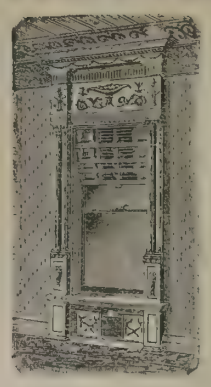

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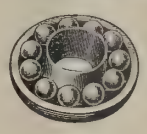

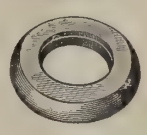

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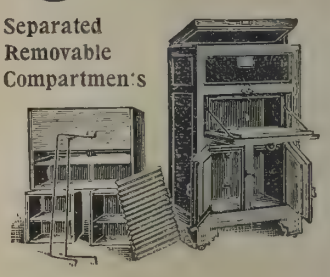

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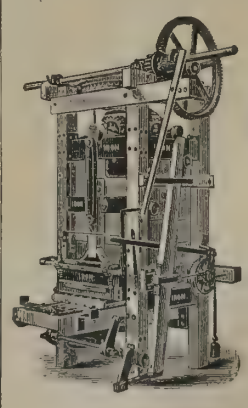

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☞ See Classified List of Advertisers in present Number on pages xiii and xiv.
☞ See Alphabetical Index to Advertisers in present Number on page xii.

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THE A. E. RANKIN MEMORIAL CHAPEL, HOWARD UNIVERSITY, WASHINGTON, D. C.—See page 38.

Scientific American.

ESTABLISHED 1845.

MUNN & Co., Editors and Proprietors,

No. 361 BROADWAY, NEW YORK.

NEW YORK, SEPTEMBER, 1896.

THE

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THE BARTHOLDI STATUE OF LIBERTY.

There was never a more graceful tribute paid by one nation to another than when the greatest republic of the Old World presented the greatest republic of the New World with a monumental piece of statuary, symbolizing America's mission as the exponent and guardian of human liberty.

Among the celebrated statues of the world there is probably none so well known as the masterpiece of the French sculptor, which dominates, with its truly noble and majestic outline, the upper waters of New York Harbor. In ancient days it would easily have ranked for size as one of the seven wonders of the world, for it is not probable that even the Colossus at Rhodes could have matched its giant proportions. Its mere bulk, however, is one of its least meritorious features: for, while the position and symbolism of the statue fully warrant its monumental size, its chief merit lies in the spirit and meaning with which the artist has so grandly inspired it—the glorious destiny of the race which it proudly declares to every visitor who enters at the great gateway of the New World.

France has always felt a warm regard for the United States, and has never been slow to show it. The cry of "Liberty, Equality, and Fraternity," in France, and the declaration that "All men are created equal," in America, were both made very near together in the closing years of the eighteenth century, and the kinship of sentiment is as strong to-day as then. When France presented the United States with the famous statue of "Liberty Enlightening the World," she paid us a noble compliment, and not more noble we trust, than true, and justly earned.

The American people are well acquainted with the facts of the acceptance of the gift, and its long delayed, but ultimate erection on Bedloes Island, in New York Harbor; but they will learn with surprise and regret that the island itself, to which the keeping of this priceless gift has been intrusted, is in a state of ruin and general dilapidation, which is positively humiliating to contemplate. The place was formerly a fort of considerable strength and importance; but it has been dismantled, and allowed to acquire that air of desolation which always broods over a dismantled fortress. It is safe to say that a visitor to New York will invariably include Bedloes Island in his list of notable places to be inspected. His first impression will be one of admiration and awe at the statue itself; his next, one of astonishment at the crumbling walls and weed-grown spaces amid which it stands. If a Frenchman should land at the cheap wooden pier, wander up the dusty path through the ramparts, climb the unpainted wooden steps which lead to the base of the statue, and look down into the brick and stone ruins which crumble at its feet, he would surely feel that his nation's gift was but little appreciated, if not entirely forgotten.

It would not be a difficult or a costly matter to transform Bedloes Island from its present ruinous condition to a picturesque park, whose well-kept lawns and walks would form a worthy surrounding to the statue. Surely, this is the very least that should be done, and we are convinced that, if the people of the United States knew of the unintentional, but very evident, neglect with which this costly gift of the sister republic is being treated, they would demand that the adornment of the island should be put in hand at once.

The place is under the care of the War Department, who would, no doubt, have undertaken the work long ago if the necessary funds had been forthcoming. The simplest way to insure the speedy and satisfactory carrying out of the work would be for Congress to appropriate a sufficient sum, and solicit competitive designs from the leading landscape gardeners of the country.

In addition to laying out the island as a park, the statue itself should be provided with adequate electric lighting, which it is far from possessing at the present time. The 84,000 candle power light formerly supplied by the Lighthouse Board has been cut down to a single light of 16,000 candle power, which looks pitifully inadequate, twinkling from its altitude of 300 feet at the top of the torch. The light should be nothing less than 100,000 candle power, and the statue itself should be illumined at night by a set of reflectors stationed around the base.

THE A. E. RANKIN MEMORIAL CHAPEL, HOWARD UNIVERSITY, WASHINGTON, D. C.

We give, pages 37 and 50, several views and ground plan, illustrating the Andrew Evarts Rankin Memorial Chapel, at the Howard University, Washington, D. C. The design is very effectively treated, though limit of cost necessitated simplicity. The structure is built of red brick, with reddish stone trimmings. The square corner tower, with roof forming octagonal spire above, is relieved by four louvred dormers, of pleasing design, all covered with dark maroon glazed tiles, trimmed with copper, and is grouped with entrance gable, having wide, pointed arch springing from platform level, and having inscription on voussoirs. The gables are covered with varicolored tiles, having round butts. Open timbering, flush with fascia of bargeboard, is original in treatment. Main roof, slated. Trimming color, deep green. Dimensions: Front, 93 ft., exclusive of extension; side, 48 ft., not including tower. Heights: Basement, 10 ft.; ground floor, distance to under side of ridge, 45 ft. Ceiling, of wood. Vestibule in tower has double-swing doors to auditorium, having a seating capacity of 800 persons. This room has Georgia pine wainscot, 4 ft. 6 in. high (to under side of sill), alternate strips being moulded; walls above plastered, sand float finish, natural gray in color. As will be seen by interior view, the roof is supported by open truss work, also of Georgia pine, strapped together with wrought iron; chandeliers, of neat pattern, being of same material; settees, of light oak; all windows of leaded glass, blue, green and yellow being predominant tints; floors of North Carolina pine; the wainscot runs through to ante and toilet rooms (with best exposed plumbing) and hall. It is the intention to use the basement for library, meeting and reading rooms. The chapel which is heated by steam, and cost, complete, $18,000, was built under the supervision of the architect, Mr. A. P. Clark, Jr., 605 F Street, Washington, D. C.

Our engravings were made direct from photographs of the chapel, taken specially for the SCIENTIFIC AMERICAN, with the kind consent and assistance of Dr. Rankin, President Howard University.

A RESIDENCE AT INDIANAPOLIS, IND.

We present an engraving, on page 43, which illustrates a residence of pleasing design, and which has been erected for Charles H. Comstock, Esq., Vice-President of the Interior Hardwood Company, at Indianapolis, Ind. The design is treated in a chaste style of architecture, and the bay window thrown out at side, and rising into a tower, gives the building a lofty and dignified appearance. The underpinning is built of brick, laid up in red mortar. The framework is constructed of the best materials, and in a thorough workmanlike manner. This framework is sheathed, papered, and clapboarded on first story, while the second story and gables are beamed forming panels, which are filled in with clapboarding. The roof is shingled. Dimensions: Front, 34 ft. 6 in.; side, 61 ft., not including front piazza. Height of ceiling: Cellar, 7 ft.; first story, 9 ft. 6 in; second, 9 ft.; third, 8 ft. 6 in. The house is planned after the reception hall order. The front end of hall, which is utilized as a vestibule, is separated from the main part of hall by an open piece of grillework, thus forming an entrance vestibule, and leaving the main part as a living room. This hall and vestibule are trimmed with quartered white oak, and each has paneled seats. The main staircase has a tall grille, in lieu of the ordinary railing, having a height of seven feet at the bottom, while the upper railing is of the ordinary height. About half-way up this stairway is a balcony, wherein may be placed flowers in the winter and a seat in summer. The floor design is chosen to suit the area, and is of oak in two shades to harmonize without strong contrasts. The parlor is trimmed with Honduras mahogany. The floor is of quartered white oak and mahogany, the former being selected in two shades to bring out the design in striking effect, and to harmonize with the inside trim and furnishing of the room. The sitting-room proper is at the back of reception hall, both of which are on the south side of house and on the corner of two streets. Back of this sitting-room is a side entrance, containing the stairway to second floor and to cellar, and opening out upon porch and to lavatory. Dining-room is trimmed with cherry, and the walls have a paneled wainscoting of cherry and oak, six and one-half feet in height, while the ceiling is beamed and paneled. The floor has a field of oak in "herring-bone" pattern, with Grecian key in the cherry, the whole being in pleasing effect as to color and effect. The fireplaces, where shown, are furnished with tiled hearth and facings, and mantels to correspond with the trim of each apartment, and made from special designs. The butler's pantry and kitchen are wainscoted, and fitted up with large pantries and the best modern convenience in the usual manner. The second floor contains three bedrooms, dressing-room, servant's room, storeroom, and bathroom. Bathroom is wainscoted, and provided with porcelain fixtures and exposed plumbing. Cemented cellar contains furnace, laundry, and other necessary apartments. Cost $5,300 complete. Mr. Louis H. Gibson, architect, Indianapolis, Ind.

Our engraving was made direct from a photograph of the building, taken specially for the SCIENTIFIC AMERICAN.

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A COUNTRY HOUSE AT DAYLESFORD, PA.

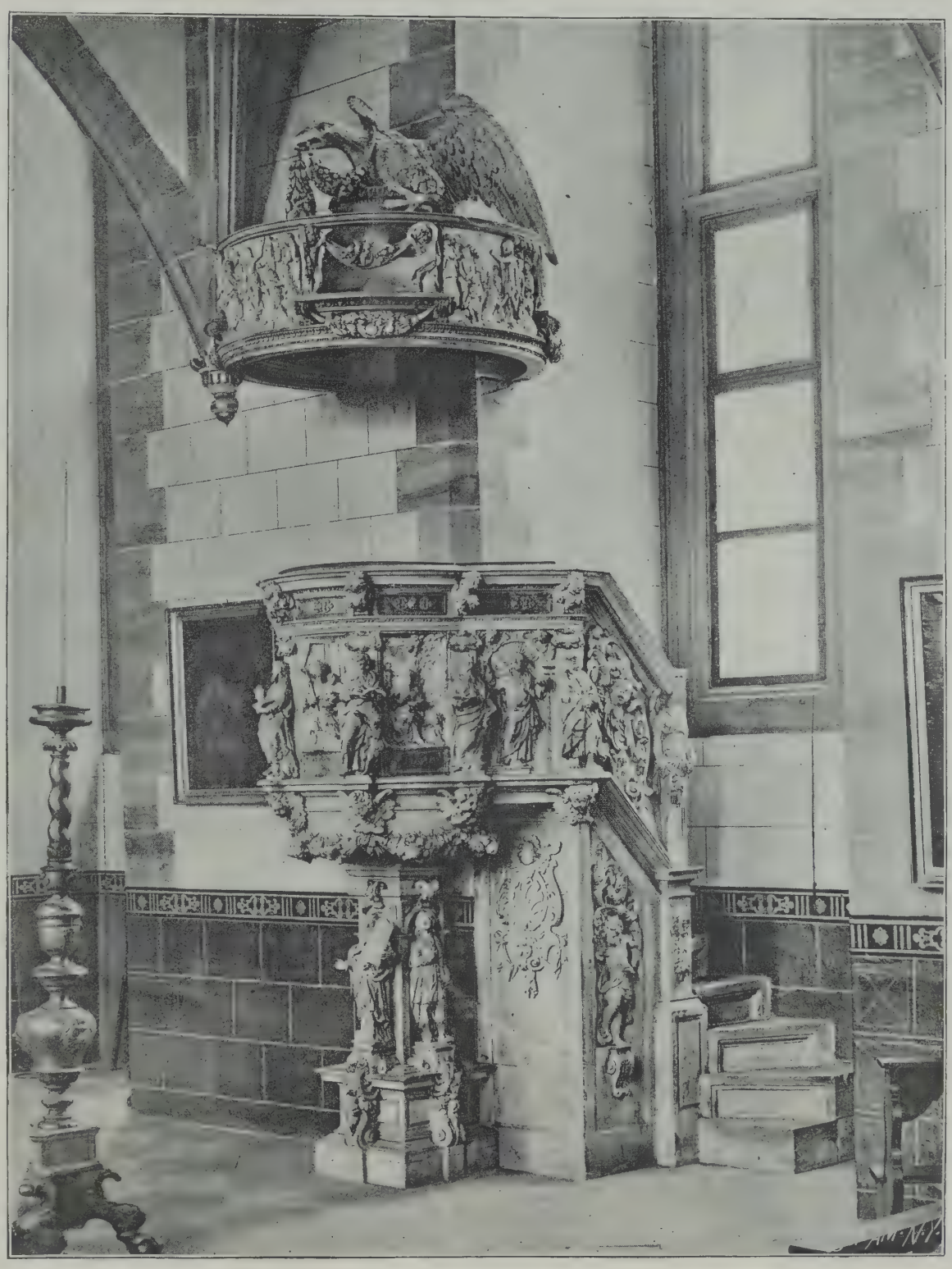
We publish on page 40 a very unique country house, erected for A. Edward Newton, Esq., at Daylesford, Pa. The design is treated in the gambrel roof style, and is a most happy example for a modern country house, as shown by the broad, well-shaded piazza, and the interior arrangement, which contains a large living-room and hall, dining-room and kitchen on first floor, and four bedrooms, seven closets, bathroom, and servants' bedroom on second floor, all good-sized, well lighted and ventilated, and furnished in a neat and artistic manner. The building has a stone foundation, while the remainder is built of wood, and covered on the exterior with shingles, both roof and sides. The roof is stained moss green, sides a rich dark brown, and the trimmings are painted white. The color scheme is a most pleasing combination. The interior throughout is trimmed with white pine and stained cherry. The walls and ceilings are covered with burlap, and treated with old brown and green, harmonizing nicely with the stained woodwork, and giving it a thorough artistic and pleasing effect. The large living-room, connected to dining-room by an archway, is provided with an ornamental staircase, with a broad landing and a paneled seat. The broad open fireplace is built of brick, with facings and hearth of same, and a mantel shelf of good design. The fireplace in dining-room is finished similar. Kitchen is provided with the usual fixtures, and the walls and ceiling are ceiled up with narrow beaded yellow pine. The man's bedroom is at the rear, with an outside entrance thereto. The servants' bedroom on second floor is reached by a private stairway from kitchen. The bathroom is wainscoted, and fitted up with porcelain fixtures and exposed plumbing. The attic contains ample storage room. Cemented cellar contains ample storage apartments. Cost complete, $3,000. Messrs. Moses & King, architects, 431 Walnut Street, Philadelphia, Pa.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

A COLONIAL RESIDENCE AT OVERBROOK, PA.

We present herewith in this issue, on page 41, a residence recently completed for Dr. A. Allison O'Daniel, at Overbrook, Pa. The lines are square, and are a feature in giving the interior a convenient arrangement. The exterior has many good features, including the circular porch at front, the well shaded piazza at side, and the balustrade, terrace effect. The underpinning is built of Chestnut Hill granite, of a light bluish-gray color. The superstructure is built of brick, and covered with stucco work, and then treated in Colonial yellow. The corners and window caps are built of buff brick. The woodwork is painted ivory white. The whole is crowned with a cove cornice, and a roof covered with shingles, and left to weather finish. Dimensions: Front, 50 ft.; side, 47 ft., not including piazza. Height of ceilings: Cellar, 7 ft.; first story, 10 ft.; second, 9 ft.; third, 8 ft. 6 in. Vestibule, reception and main hall is finished in white China gloss and mahogany. It has a paneled wainscoting. At the rear end of the hall is the large, open staircase, of mahogany, with a triple window extending to the top of second story, and glazed with delicate tinted glass, which sheds a soft and pleasant light over both upper and lower halls. Under this staircase there is a circular shaped den, 12 ft. in diameter. It is finished in oak and terra cotta, and contains an open fireplace, built of Pompeian brick and pink marble. The parlor is treated in China gloss and gold, and the library, connected by sliding doors, is finished in mahogany. The latter is provided with an open fireplace, trimmed with onyx tiling, marble, and an exquisitely carved mantel. Both have triple windows, front and rear, and large doors, glazed with one pane of plate glass from floor up, and opening out on porch. Dining-room is a very handsome apartment, oval in shape, and finished in white enamel and mahogany. It has a paneled wainscoting and ceiling beams, and an open fireplace, trimmed with onyx tiling. There are also two china closets and buffet built in, carved, and provided with leaded glass doors. Butler's pantry is furnished with closets, cupboards, dressers, drawers, butler's bowl, and everything replete. Rear kitchen and laundry are of good dimensions, and are trimmed and wainscoted with white pine, finished natural. They contain the usual fixtures, with the best appointments. The rear hall contains the stairs to cellar and to third floor, and also provides an entrance to kitchen. The second floor contains a large, open hall, five bedrooms, nine closets, and bathroom, the latter tiled, and provided with the usual porcelain fixtures, with nickelplated exposed plumbing. Third floor contains two chambers, one servant's bedroom, bath, billiard room, four storerooms, and a mothproof closet. The cellar contains coal cellars and other necessary apartments. The house is heated by the indirect system of steam heat from a central plant, and is lighted by electricity and high pressure water from artesian well, all furnished from a central plant. Cost $8,500 complete. Mr. Horace Trumbauer, architect, No. 310 Chestnut Street, Philadelphia, Pa.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.



A PULPIT AT ASCHAFFENBURG.

A PULPIT AT ASCHAFFENBURG.

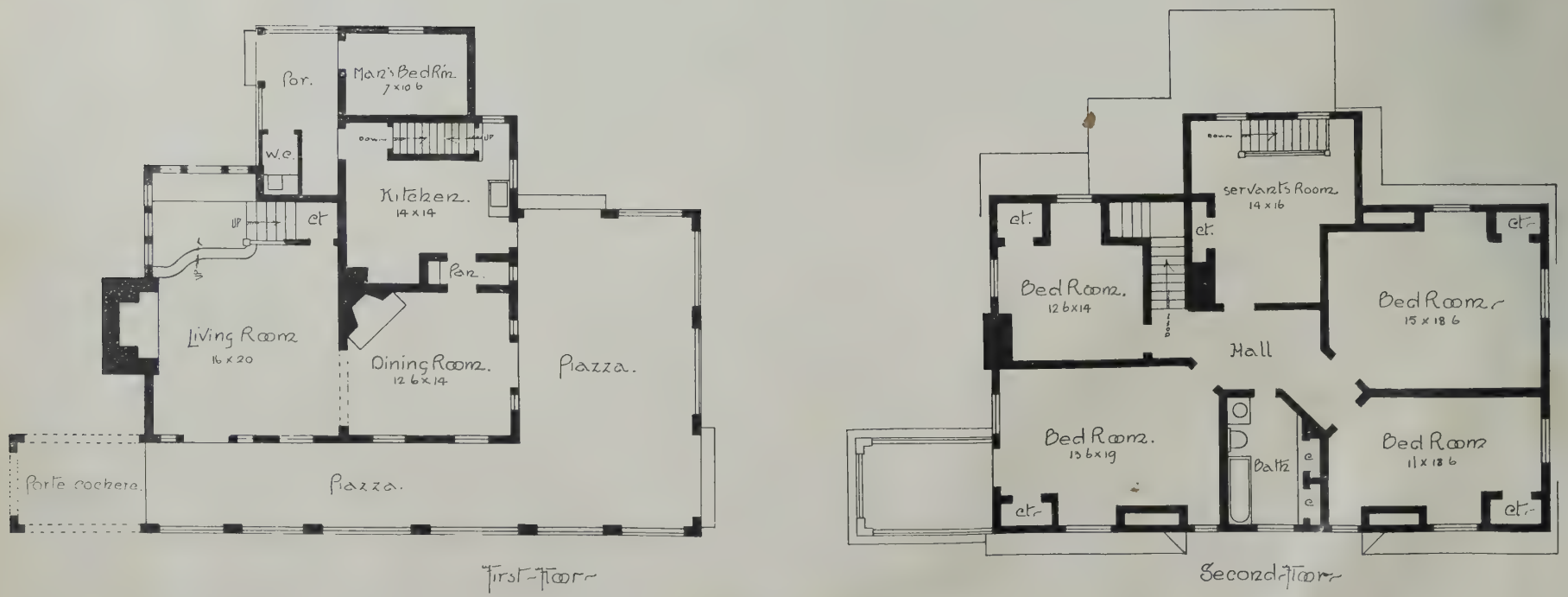
Aschaffenburg is a town in Lower Franconia, in the kingdom of Bavaria. Its history goes back to Roman times, and it has long been noted for its educational establishments. The Pompeianum, a villa erected by King Louis of Bavaria in 1824-49, in imitation of the house of Castor and Pollux, at Pompeii, is one of the sights of the town, as is also Abbey Church, which contains fine monuments. The schloss, or castle, with its four lofty towers, 191 feet high, was erected in 1605–14. We give herewith an engraving of the pulpit in the castle chapel, for which we are indebted to the *Blätter für Architektur und Kunsthandwerk*. This pulpit was built in 1630, from designs by Georg Riedinger, of Strasburg. The name of the builder is unknown. The design of the pulpit is good, considering its date, for it was made in the midst of the Rococo period. The combination of conventional ornament with figures in the round and bas-relief has not usually been as successful, except in in the hands of a few of the best Italian sculptors.

A RESIDENCE AT NEWTON CENTRE, MASS.

We present herewith in this issue, on page 42, a residence which has recently been erected for Francis Bellamy, Esq., at Newton Centre, Mass. The engravings present one of the most unique, artistic, and attractive surburban residences in the vicinity of Boston. It combines not only pleasing elevations, but a well arranged plan. A feature worthy of note is the piazza which surrounds the front and side, and which is partly covered with a roof, the remaining part being built so as to give light and ventilation to the library and dining-room. The underpinning is built of local stone. The exterior frame-work is sheathed, and then covered with paper. The first and second stories and gables are covered with clapboards, and painted a dark, rich red, with trimmings painted ivory white. The roof is covered with shingles and stained moss green, and the whole scheme of coloring is most excellent. Dimensions: Front, 40 ft.; side, 36 ft., not including piazza. Height of ceiling: Cellar, 7 ft.; first story, 9 ft. 6 in.; second, 9 ft.; third, 8 ft. The interior treatment is rendered in an exquisite manner. The main hall is treated with China white. It has a paneled wainscoting and seat, hardwood floor, polished, and an ornamental staircase with spindle balusters, and newel post formed of same in a cluster, and painted white, while the rail is turned out of mahogany. The main landing is fitted up with a window seat and nook. The parlor is treated with China white in a dainty manner. The library is also treated with China white, dead finish, and is furnished with bookcases built in, a bay-window with paneled seats, and an open fireplace built of Tiffany brick, with hearth and facings of same, and a mantel of wood. Dining-room is painted in a sea green color, with a cool effect. The cluster of small latticed windows at side of room is one of the features, and the corner fireplace is built of brick, and is provided with a suitable mantel. Butler's pantry, kitchen, and its apartments are wainscoted and trimmed with yellow pine, finished natural, and are fitted up with the best modern conveniences. The rear hall is conveniently located. The second floor is treated in a similar manner, and it contains three bedrooms, dressing room, closets, den, and bathroom. The latter is wainscoted, and provided with porcelain fixtures and exposed plumbing. Third floor contains two bedrooms and trunk room. Cemented cellar contains furnace, laundry, and other necessary apartments. Mr. C. H. Blackell, architect, Boston, Mass.

Our engraving was made direct from a photograph of the building, taken specially for the SCIENTIFIC AMERICAN.

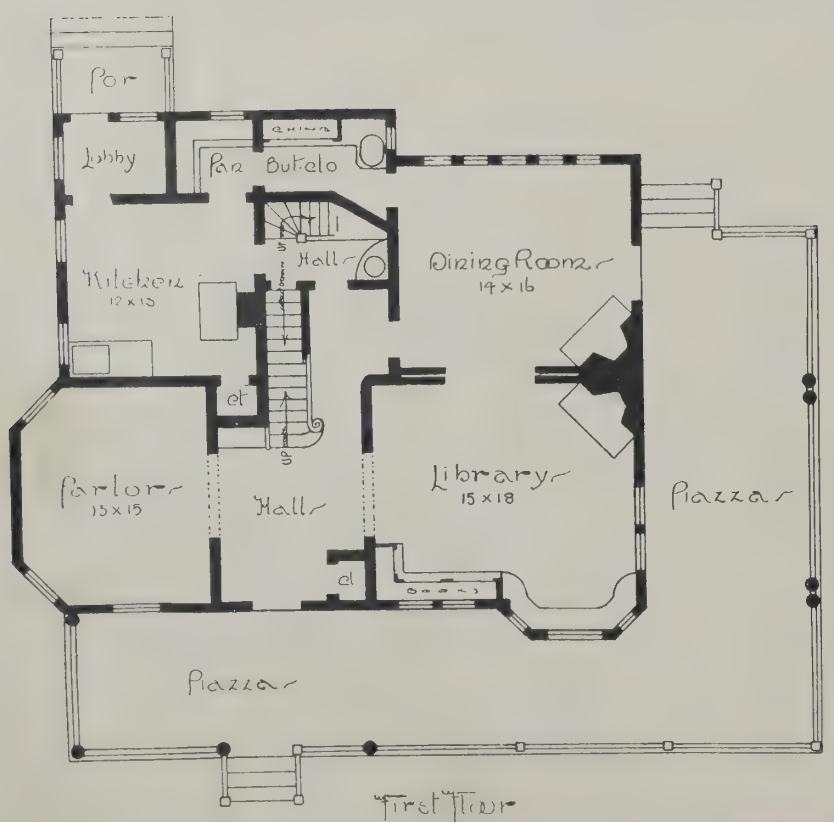
IN the Japanese Imperial Budget for the current year, the sum of $21,639 has been set aside for earthquake investigation. This is a grant over and above the usual expenditure of the central observatory controlling the seismic survey of the country.

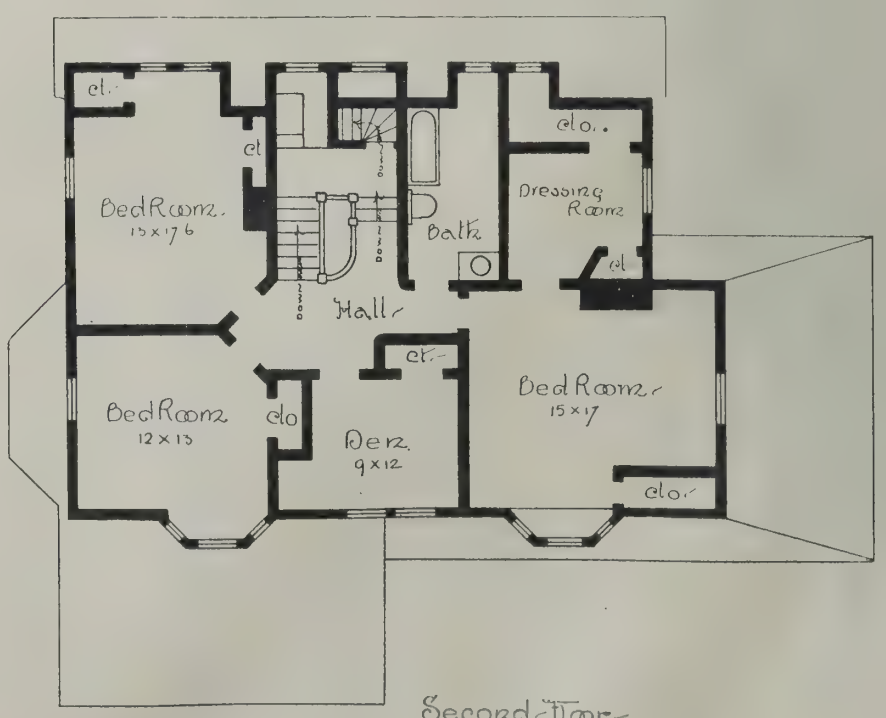


BOSTO IBRARY.

A COUNTRY HOUSE AT DAYLESFORD, PA.—See page 39.

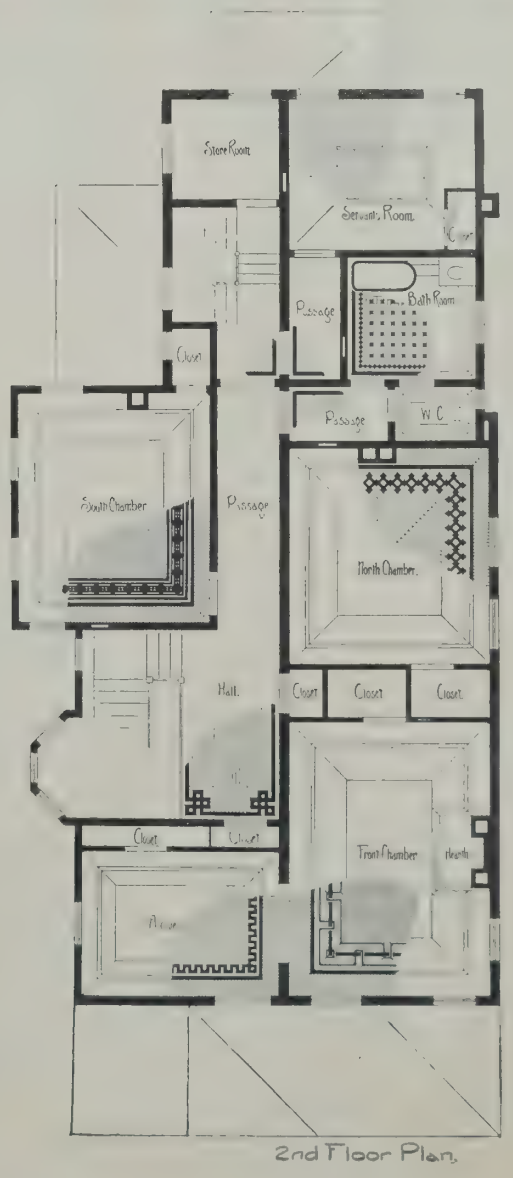
A COLONIAL RESIDENCE AT OVERBROOK, PA.—See page 39.





BOSTON PUBLIC LIBRARY.

A RESIDENCE AT NEWTON CENTRE, MASS.—See page 39.



BOSTON PUBLIC LIBRARY.

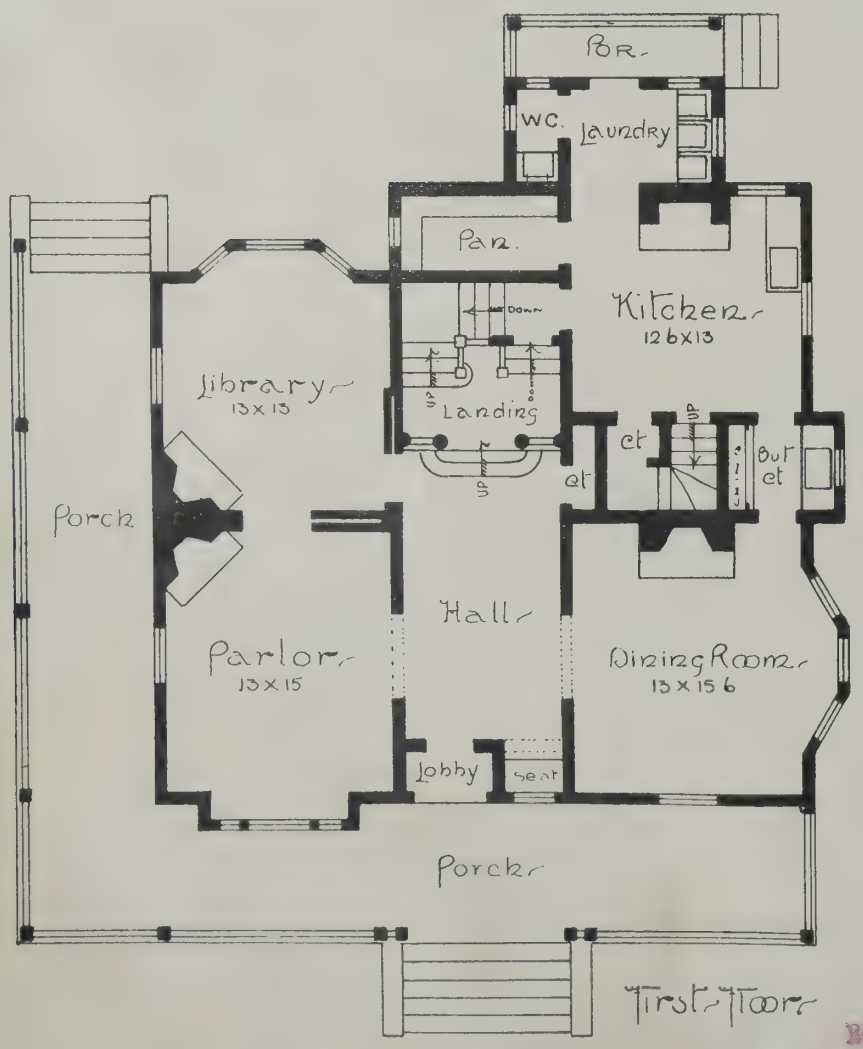
A RESIDENCE AT INDIANAPOLIS, IND.—See page 38.

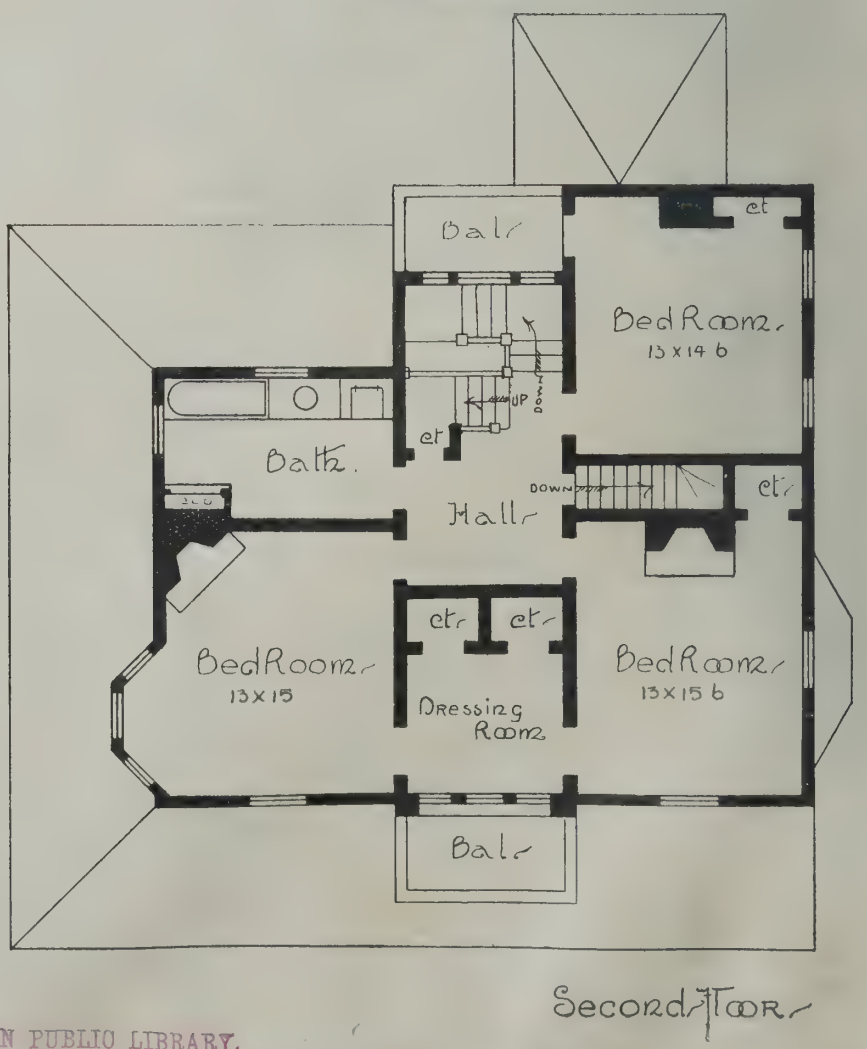
First Floor.

A COUNTRY HOUSE AT LAWRENCE PARK, BRONXVILLE, N. Y.—See page 52.

BOSTON PUBLIC LIBRARY.

A COUNTRY HOUSE AT LAWRENCE PARK, BRONXVILLE, N. Y.—See page 52.





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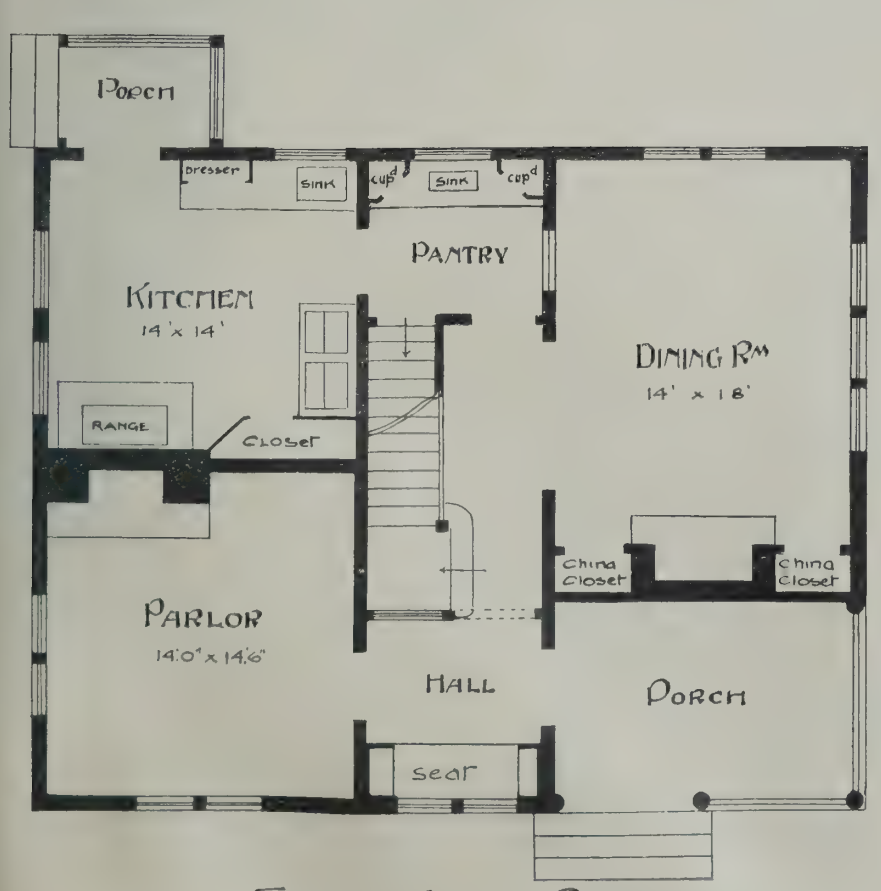
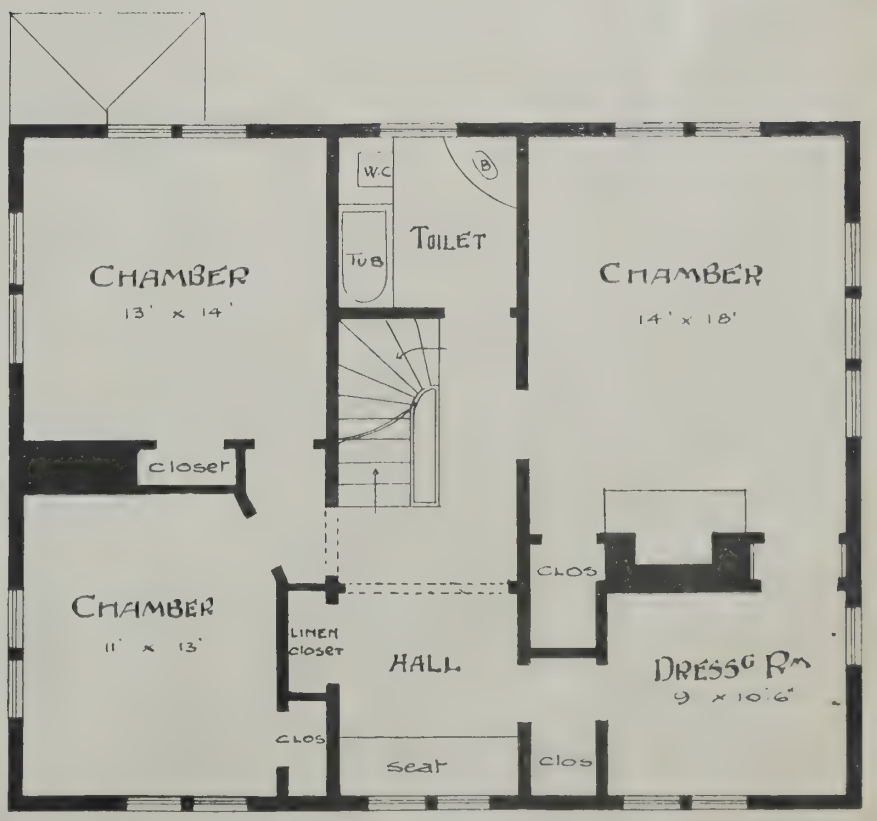
A DWELLING AT BENSONHURST, LONG ISLAND.—See page 52.

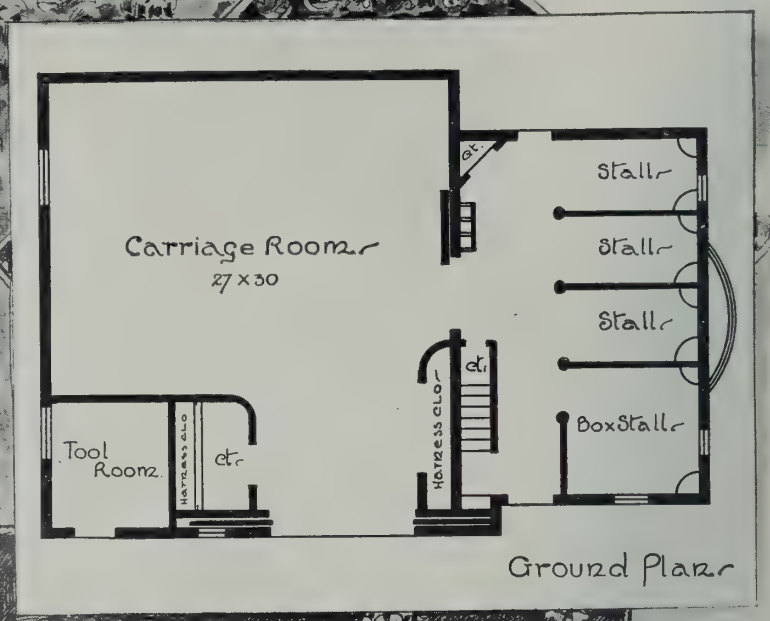


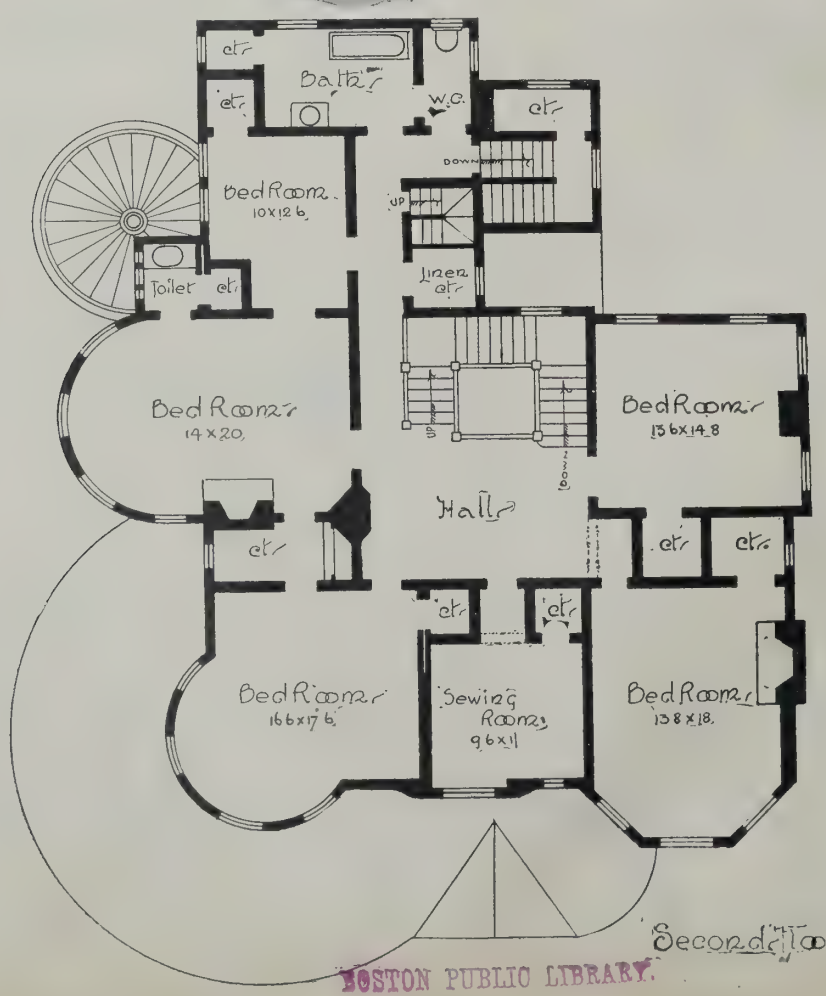
FIRST FLOOR PLAN



SECOND FLOOR PLAN

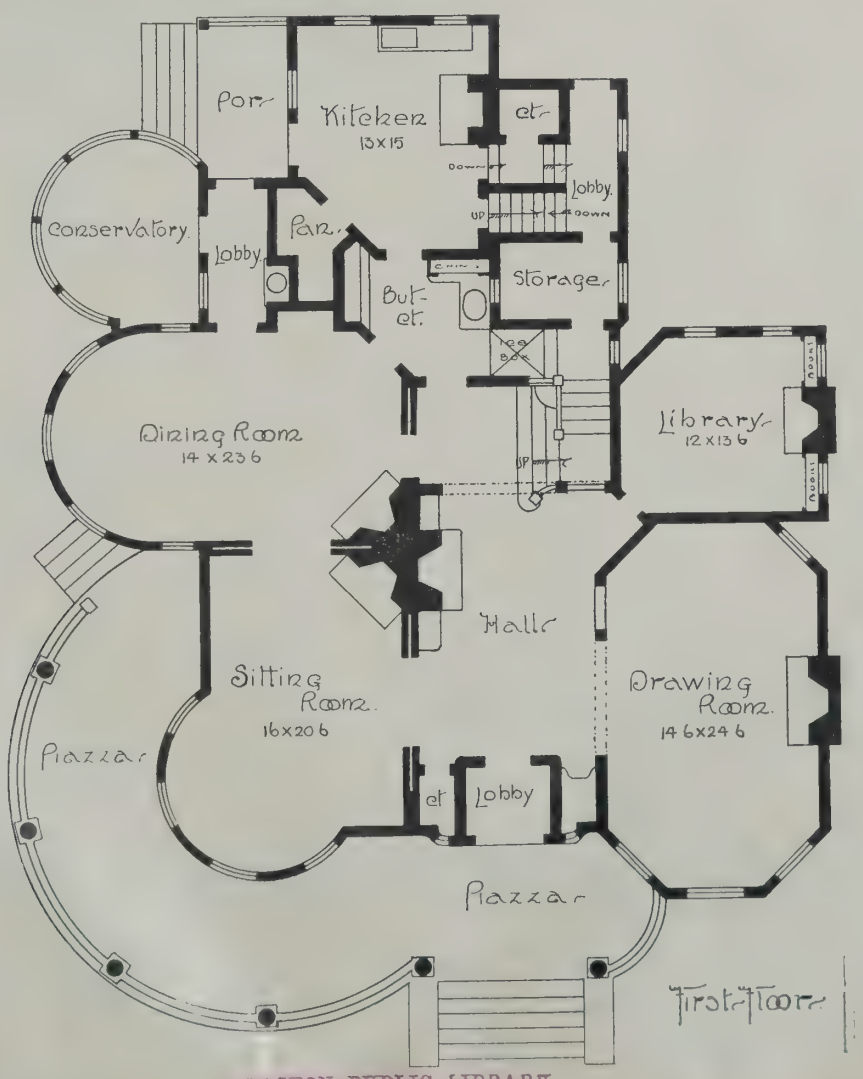
A COTTAGE AT NUTLEY, N. J.—See page 52.





BOSTON PUBLIC LIBRARY.

A RESIDENCE AND STABLE AT JAMAICA, LONG ISLAND.—See page 52



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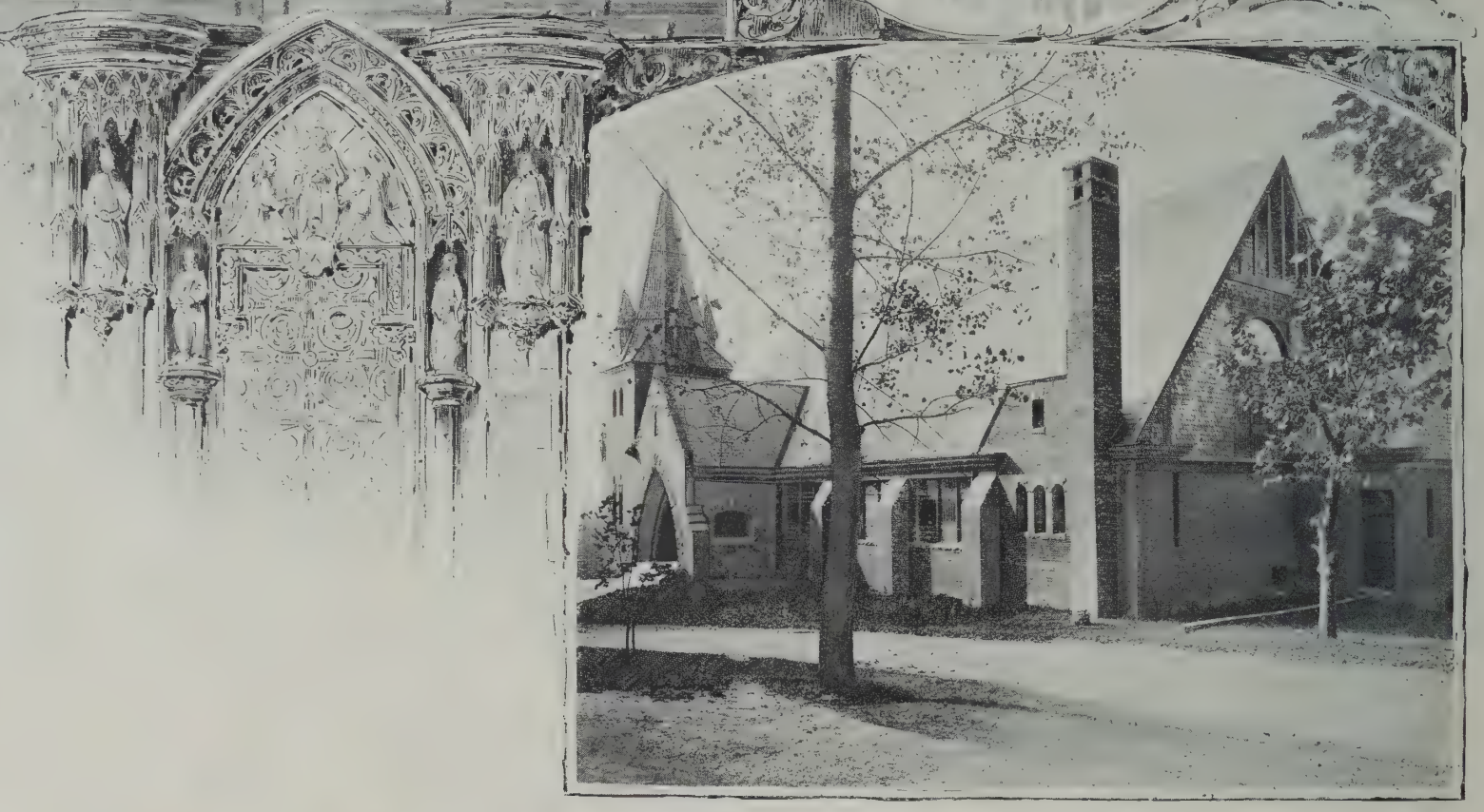
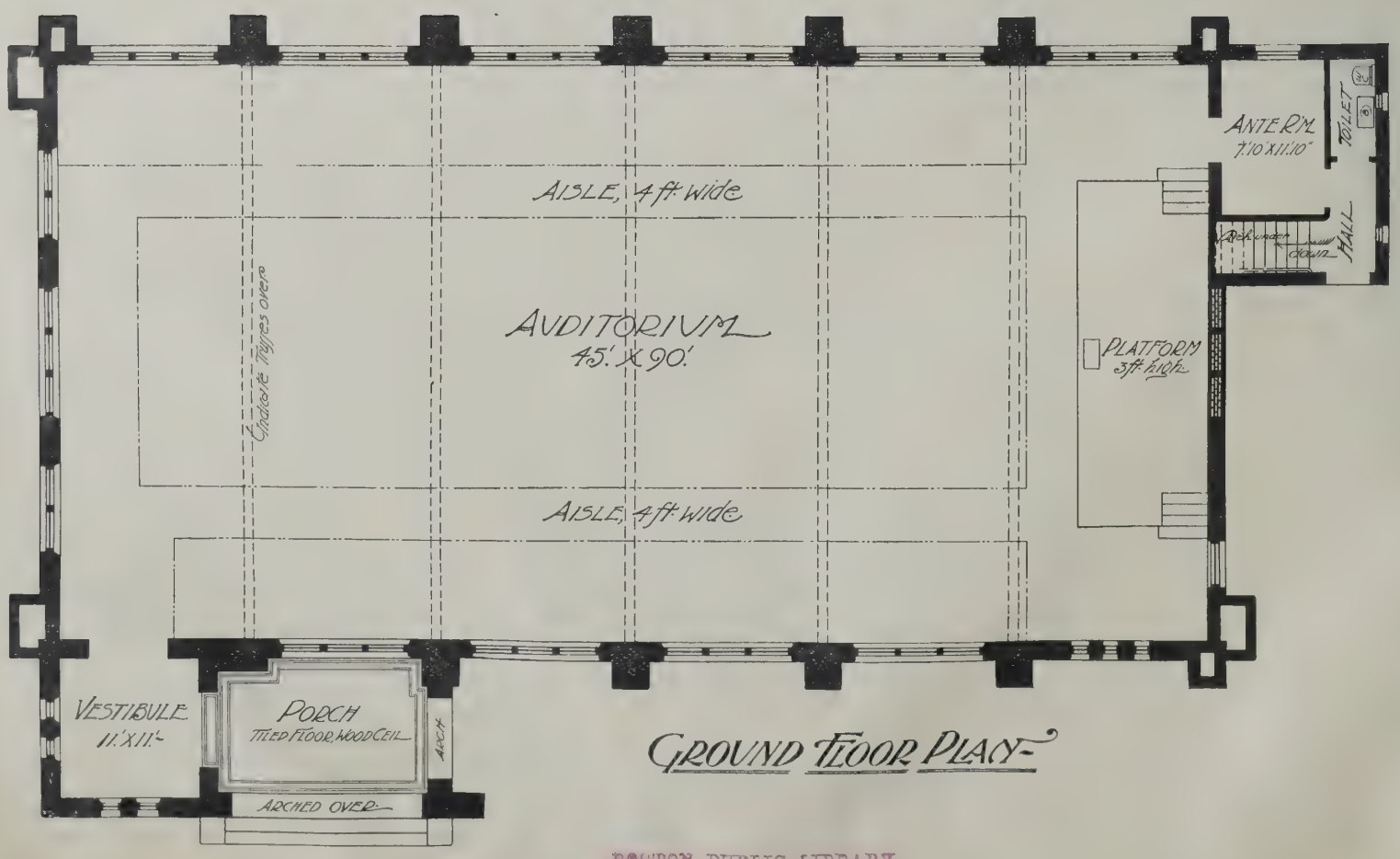
A RESIDENCE AND STABLE AT JAMAICA, LONG ISLAND.—See page 52.

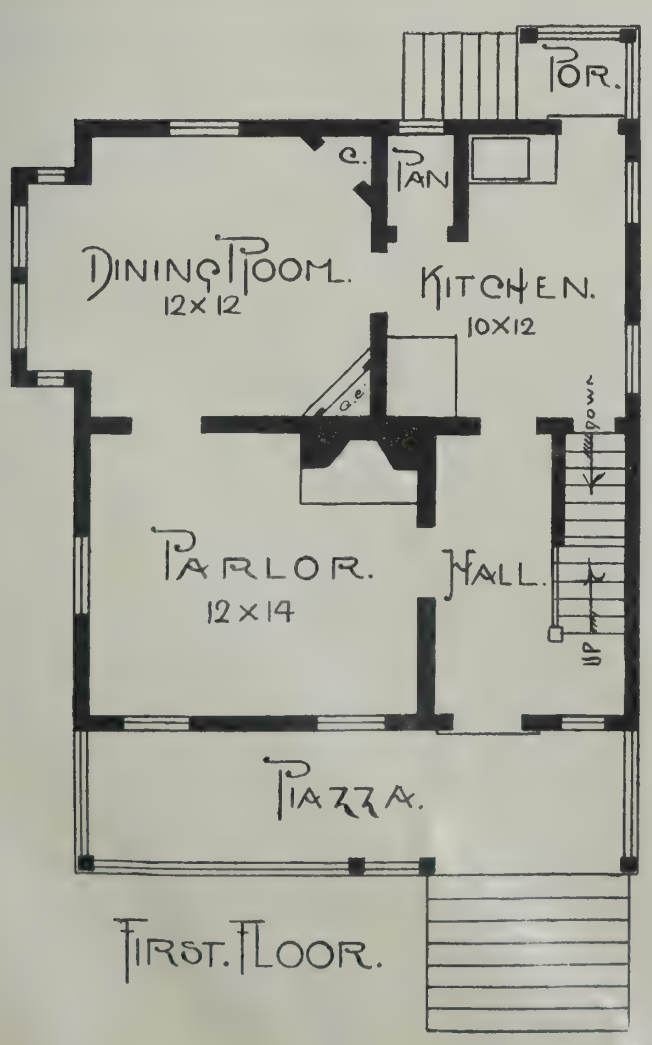




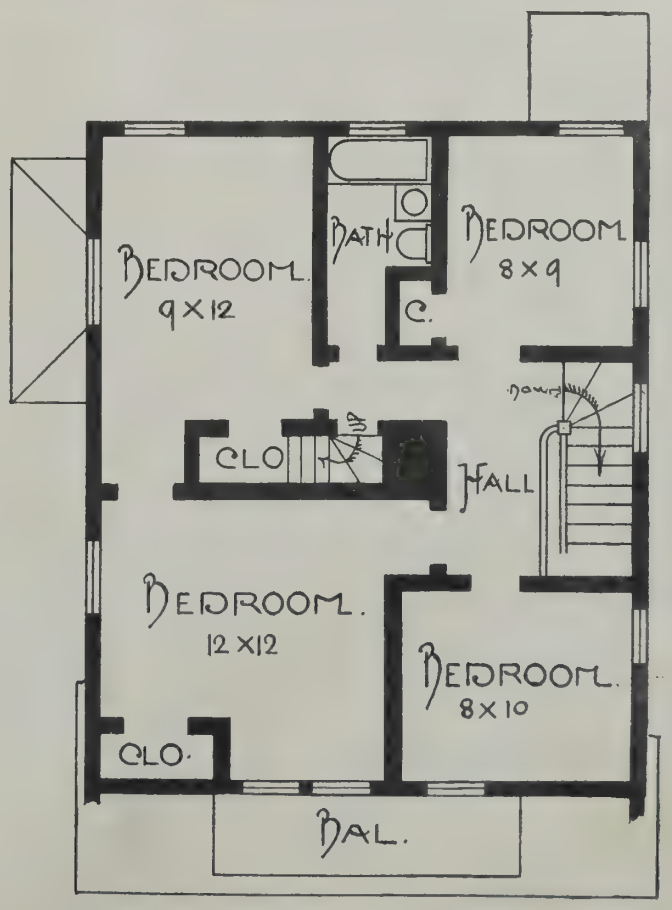
GROUND FLOOR PLAN.

BOSTON PUBLIC LIBRARY.

THE A. E. RANKIN MEMORIAL CHAPEL, HOWARD UNIVERSITY, WASHINGTON, D. C.—See page 38.



FIRST FLOOR.



SECOND FLOOR.

BOSTON PUBLIC LIBRARY.

SOME LOW COST DWELLINGS AT ISELIN'S PARK, NEW YORK.—See page 52.

A RESIDENCE AND STABLE AT JAMAICA, L. I.

We present herewith in this issue, on pages 48 and 49, a residence and stable erected for Theodore R. Chapman, Esq., at Jamaica, L. I. The engravings present a design treated in the modern style of architecture, with the lines well broken by many good features, including the spacious piazza, bay-window, tower, and chimneys, giving the whole treatment an excellent effect. The building is constructed of the best materials, and in a thorough workmanlike manner. The underpinning is built of local rock-faced bluestone. The superstructure is constructed of wood, and the exterior framework is sheathed, papered, and then covered with 1½ inch furring strips, forming air space, and allowing for rabbet on casings, belt courses, etc., making a perfectly air and water tight work, and then the whole covered with clapboards and shingles, and painted a silver gray, with trimmings of a lighter shade. The roof is covered with octagonal and square cut slates. Dimensions: Width, 51 ft. 8 in.; depth, 59 ft. 3 in., not including piazza. Height of ceilings: Cellar, 7 ft. 6 in.; first story, 10 ft. 7 in.; second, 9 ft. 7 in.; third, 9 ft. The interior arrangement and its combination of conveniences are remarkably complete. The vestibule and hall are treated in the Gothic style, with column trim formed of cluster columns, fluted and provided with carved capitals, and rising from a pilaster to ceiling, and supporting a massive carved frieze and cornice. These apartments are trimmed with quartered oak, and are provided with a paneled wainscoting four feet in height; the space above wainscoting and ceiling is beamed, forming panels that are covered with burlap and decorated. The trim, door casings, and all woodwork throughout these apartments, and the first and second floors, are carved in a most magnificent manner, and handsomely finished. The floor is of solid oak. The vestibule has a floor laid in tiled mosaic, while a hat rack is built in on one side, and a coat closet on the other. The archway between hall and drawing-room is provided with a pillar formed of a cluster of six columns, and a grille screen, carved in a fine tracery of openwork. The staircase has a similar screen, and the newel post and each baluster are hand carved. The main newel post is provided with a candelabrum. A stained glass window on second landing adds much beauty to the general effect. A feature of this staircase is the open way in which it is built from first to third floor, and above which is a massive dome-shaped skylight, glazed with stained glass, and shedding a soft and pleasant light over upper and lower halls. The fireplace runs from floor to ceiling, and is tiled and faced on return with tiles of an olive green shading, and provided with a massive carved mantel. The hardware and trimmings, and also chandelier, are of lemon brass, and made from special design. The general treatment of the drawing-room is in the Rococo style. The decorations are carried out in solid relief and fresco combination. The side walls are provided with a carved and paneled wainscoting, two and one-half feet in height, and above which the walls are treated in old rose and gray, and the relief ornamentation in cream and gold. The woodwork is of curly white maple of the column order. The open fireplace, trimmed with a tiled hearth and facings, is provided with an elegant carved mantel, with columns and mirror, and made from special design. The trimmings and gas fixtures are of silver and gold, very artistic, and from special designs. The floor is of white maple, and highly polished. The library in treated in a unique manner in the Moorish style. It is trimmed with red brick, and is provided with a paneled wainscoting. The walls and ceiling are treated in old rose, with gold and silver relief decoration. The fireplace is provided with brown English tiled facings and hearth, and a carved mantel, with columns and mirror. Bookcases are built in on either side, and provided with leaded glass doors. The windows over same are glazed with stained glass. The chandelier, gas brackets, hardware, and trimmings at fireplace are of wrought iron, finely executed in design. The sitting-room is trimmed with white ash, column trim, and is treated in Louis XVI. style in old gold effect. The fireplace, of unique and special design, is oval in shape, and is fitted up with tiled trimmings and a massive carved mantel, with columns extending to ceiling. The metalwork, hardware, and chandelier are of oxidized silver. The dining-room is trimmed with quartered oak, column trim, with the columns resting on wainscoting, which is paneled. It is treated in the modern Renaissance style, with the tone of coloring in steel blue and silver. It contains a buffet, built in, and handsomely carved and fitted up with leaded glass doors, columns, etc., and also a fireplace, built of Philadelphia and Boston pressed brick, red and buff combination, with mantel constructed with similar material. The metalwork is of lemon brass. The floors throughout are of oak, and highly polished. The rear hall is a convenience, and it contains lavatory, and it also provides an entrance into conservatory, which is also a good feature. The latter is fitted up with a tiled floor, and the windows and roof are glazed with circular bent glass. Butler's closet is trimmed with white ash, and is furnished with butler's bowl of Italian marble, and the usual fixtures complete. A feature worthy of note is the ice-box, built in, and which contains a coil of pipe, resting under the ice, and through which passes the drinking water, cooling on its way, to a faucet over the butler's bowl, and from which ice-cold water can be drawn when desired. Kitchen and pantry are trimmed and wainscoted with pine, and are fitted up with the best modern conveniences. The fireplace is built and faced with white enameled tiles. The second floor is trimmed with white curly maple. It contains five bedrooms, dressing-room, large closets, and bathroom. The family room is finished in Louis XV. style. The tone of color is light sage green. The children's room at rear is treated in old blue. The front room is treated in the Renaissance style, with pink and white. The sewing room is treated in the Colonial style, yellow and white. The guest room in front is treated in the Empire style, and the color scheme is Delft blue in furnishings, fireplace, and wall decorations. The west room is treated in the Rococo style, and is a copy taken from room of Marie Antoinette in the "Chambre in Fontainebleau." Bathroom is wainscoted with white glazed tiles, and the floor is paved with unglazed tiles. The walls above wainscoting are painted and combed, yellow in tone, and in harmony with the white trimmings, porcelain fixtures, and exposed plumbing. The windows are glazed with leaded stained glass, of rich design and tone of coloring. The medicine closet is located conveniently, and well lighted and ventilated. The third floor contains two bedrooms, play-room, 18 x 34 feet, and trunk room. Cellar contains furnace, laundry, and other necessary apartments. Mr. D. H. Vail, architect and builder; S. B. Carman, mason; W. L. Hall, painter; E. D. Doran, roofer; C. H. Woolley & Bro., plumbing, and H. M. Haviland, gas fixtures, all of Jamaica, L. I.; and Messrs. Hardy, Voorhees & Co., hardwood trimming; Bloor & Tuckhorn, leaded glass, and Hyde & Gload Mfg. Co., tiling, all of Brooklyn, N. Y., were the contractors. The decorations were executed by H. W. Guterman, of Rockville Centre, L. I.

The stable, shown on page 48, presents an artistic design with many good features, and is treated in a style in keeping with the residence and its surroundings. The foundation is built of stone. The framework is built of studding, sheathed on the exterior, and then clapboarded, while the gables are shingled. The roof is shingled. The carriage room is large and roomy, and is so arranged that each carriage can be handled without disturbing each other. The harness closets are commodious, and fitted up in the most approved manner with sliding glass doors and iron fixtures. The stable is conveniently located in connection with carriage room, and it contains three single stalls and one box stall, fitted up and provided with the usual iron fixtures. The space behind the stalls is wide enough to give ample working room. Stairs lead to second floor, which contains a loft, large and roomy, and also the coachman's quarters. The walls and ceilings are ceiled up with narrow beaded yellow pine and oiled. The floors, of wood, have an advantage over the stone and concrete ones, because it emits no sound.

Our engravings were made direct from photographs of the building, taken specially for the Scientific American.

A DWELLING AT BENSONHURST, L. I.

We present herewith, on page 46 in this issue, a dwelling which has been erected for Mrs. Lydia J. Roberts, at Bensonhurst, L. I. The design is of simple execution, well studied, and presenting many bits of artistic values, which add much to the excellent effect sought. The underpinning is built of rock-faced bluestone. The superstructure of wood is covered on the exterior with clapboards and shingles, the former being painted a silver gray color, while the latter is left to finish natural. The roof is also shingled, and left to weather finish. Dimensions: Front, 39 ft. 6 in.; side, 42 ft. 6 in., not including piazza. Height of ceilings: Cellar, 7 ft.; first story, 9 ft.; second, 8 ft. 6 in.; third, 8 ft. The whole scheme of treatment of the walls, ceiling, and finish is most excellent. The hall is treated with China white in a dainty manner. It has a paneled wainscoting and a wood cornice. The lobby is paneled, and the nook at side is fitted up with a window seat. The staircase is of unusual beauty in design, and is formed by Colonial columns running from floor to ceiling, providing a broad landing, from which rise the stairs to second floor. This staircase is lighted effectively by a cluster of stained glass windows. The opening between hall and the various apartments are provided by spindle transoms. The parlor and library is treated in China white, and each room is provided with a bay window and an open fireplace trimmed with tiled hearth and facings, and mantels of excellent design. Dining-room is trimmed with whitewood, and finished natural. It contains ceiling beams, and an open fireplace built of Tiffany brick, with hearth and facings of same, and a mantel of excellent design. The butler's closet is well located, and is fitted up replete. Kitchen is trimmed and wainscoted with whitewood, and is furnished with a large pantry, closet, laundry, and other necessary apartments. The second floor is treated throughout with China white, and it contains three bedrooms, dressing-room, and bathroom; the latter wainscoted with white English tiling, and provided with exposed plumbing. Third floor contains two bedrooms and ample storage. Cemented cellar contains furnace and other necessary apartments. Cost $4,500 complete. Mr. J. J. Petit, architect, 186 Remsen Street, Brooklyn, N. Y.

Our engravings were made direct from photographs of the building, taken specially for the Scientific American.

A COTTAGE AT NUTLEY, N. J.

We illustrate herewith, in this issue, on page 47, a cottage built at Nutley, N. J. The basement is of rubble stone with cement joints; the sides are covered with shingles; the chimneys are of brick. The plan is simple, but convenient, and has full equipment for a small cottage. The dining-room is 18 x 14 ft.; kitchen, 14 x 14 ft., with range, tubs, sink, dresser, etc., and the pantry connects the kitchen and dining-room. The parlor is 14 x 14 ft. 6 in., which is entered from the hall directly opposite the entrance door. The staircase is easy, and finishes on to a landing with an arched alcove, inside of which is the linen closet, and a seat running across the windows. There are three bedrooms and one dressing-room; each room has a closet. The toilet room is fitted up with tub, handbasin, and water closet. The cost is $3,500. The architect was Mr. E. R. Tilton, of New York.

Our engravings were made direct from photographs of the building, taken specially for the Scientific American.

A COUNTRY HOUSE AT LAWRENCE PARK, BRONXVILLE, N. Y.

We publish herewith in this issue, on pages 44 and 45, engravings showing both perspective views of the exterior and interior and floor plans of "Linden Terrace," recently completed for W. W. Kent, Esq., at Lawrence Park, Bronxville, N. Y. The elevations are most picturesque, and are artistically executed in a rustic manner. The tower, porch, gables and chimneys are all good features. The terrace and part of first story are built of rock-faced field stone, laid up at random. The remainder of the building is built of wood, with the exterior shingled, and finished in their natural pine state. Trimmings are painted bottle green. The roof is shingled, and stained a moss green. Dimensions: Front, 76 ft.; side, 45 ft., not including porch. Height of ceilings: Cellar, 8 ft.; first story, 9 ft. 3 in.; second, 8 ft. 9 in.; third, 8 ft. 9 in. The interior throughout is trimmed with North Carolina pine. The floors are laid with oak. Hall is treated with China white. It has a paneled wainscoting, neatly trimmed doorways, and contains an ornamental staircase, with spindle balusters and oak newel posts and rail. The parlor has an open fireplace built of Roman brick, with facings of same, and a tiled hearth. The mantel is of excellent design, and the nook, at side, contains a paneled divan. Living room is a spacious apartment. It is finished natural, and is provided with ceiling beams, paneled divan, and a large, open fireplace built of Roman brick, with hearth and facings of same, and a neat mantel, with massive carved columns. Dining-room walls are paneled to a height of eight feet, and then stained a sea green, with a cool and pleasing effect. The pantries, rear hall and kitchen are wainscoted with narrow beaded stuff, and are provided with the best modern improved fixtures complete. The second floor is treated in delicate colors. It contains six bedrooms, nine closets, linen closet, and two bathrooms. The latter are furnished in a handsome manner, with exposed plumbing. The third floor contains billiard room, three bedrooms, and trunk room. The bedroom over living room is provided with fireplace and a window seat, and the one over the kitchen is used as a nursery. Cemented cellar contains furnace, laundry, and other apartments. Approximate cost, $10,000 complete. Mr. W. W. Kent, architect, 1262 Broadway, New York.

Our engravings were made direct from photographs of the building, taken specially for the Scientific American.

SOME LOW COST DWELLINGS AT ISELIN'S PARK, NEW YORK.

We publish herewith in this issue, on page 51, an engraving showing some low cost houses which have been erected for Burthold Block, Esq., at Iselin's Park, New York. The foundation is built of stone, laid up at random in a rough manner, with corners and joints faced with brick. The exterior framework is sheathed and papered. The first story is clapboarded and painted light gray, with darker trimmings; second and third stories are shingled and stained mahogany color. The roof is shingled and left to weather finish. Dimensions: Front, 26 ft.; side, 25 ft. 6 in., not including piazza. Height of ceilings: Cellar, 7 ft.; first story, 9 ft.; second, 8 ft. 6 in.; third, 8 ft. The interior is trimmed with whitewood. The doors and windows have neat moulded and beaded casings, and all the woodwork throughout is finished natural. Hall contains an ornamental staircase turned out of ash. Parlor is provided with an open fireplace, built of brick, and furnished with tiled trimmings and a hardwood mantel. Dining-room is furnished with a bay window, china cabinet, and closet. Kitchen and pantry are wainscoted and fitted up complete with the usual fixtures. The second floor contains four bedrooms,

closets, and bathroom, the latter being wainscoted and fitted replete. One bedroom and ample storage on third floor. Cemented cellar contains furnace, laundry, and other apartments. Cost $1,800 approximate. Mr. G. K. Thompson, architect, New York,

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

Carving Before or After Placed.

It would be interesting to learn just why so many stone carvers prefer to work on the material after it has been built into a structure rather than on the block before placing. When interrogated as to this preference, the usual answer is that it is thus easier to match the cutting on adjoining blocks, or that one gets a better idea of the effect in this way. Or perhaps it may be argued that there is danger of damage to delicate reliefs in handling the blocks and getting them into position. Yet neither or all of these appear to be sufficient reasons—sufficient, that is, to offset the disadvantage of working in awkward positions, of not having spare tools handy, and of the danger of mutilation of a placed stone by a slip. As to the latter, which would apparently be a very serious and expensive matter usually, one carver, whose specialty is scroll and leaf cutting, medallions, pilaster and column capitals, etc., says that he can generally get over or conceal small breaks by slightly altering the design. But, after all, the practice does not seem reasonable, and none of the explanations are quite satisfying. Of course, there are cases where there is no choice, but for the most part the ornamental work could, it would seem, be done to better advantage in the yard or under cover than when the workman is slung up on a staging. All the delicate reliefs, even in limestone and sandstone, or soft material in general, could be crated and otherwise protected for handling in setting up.

Both systems seem to have been followed by the ancient Egyptian and Greek cutters, though it is not always easy to determine the method. From what is known of the skill of the old constructors in getting heavy material into place, making close joints and perfect matching, it may be concluded that a large part of the carving was done before erection. We degenerate moderns, too, have some tricks of our own, going so far now in good practice as to have pressed and ornamental brick snugly packed in crates at the brick yards, transported in these crates, and finally swung up in them to the level where the bricks are to be set, and not for convenience in handling merely, but to avoid chipping of corners and edges, thus effecting quite a little saving. Finished stone also can be protected against rough usage in transportation, as is being done daily everywhere.

It was suggested to an expert carver who favored the plan of working on the building rather than on the unassembled parts of it, that his preference was perhaps only the outcome of convention and habit, and it was delicately intimated that possibly he had not ever considered the matter seriously. But he would not have it that way at all, though he could not make the meddlesome outsider understand why he liked to work lying down or doubled up rather than in the normal posture of other artisans.—*Stone.*

The Elevator Problem in Tall Office Buildings.

Few manifestations of the capabilities of the modern engineer in this the age of steel are more impressive than the tall office buildings of our great cities. These structures, from their size, appeal to the public. Groups of people may often be observed standing on the sidewalks, in the vicinity of especially striking examples, looking up at them as at one of the wonders of the day. The same class of building interests the engineer. In them he finds embodied some of the boldest conceptions of his science. The carpenter, in erecting a fully framed wooden building, first makes a self-sustaining skeleton of beams, and then incloses it by boards. The modern tall office building is of analogous construction. A frame of steel is set up, which is self-sustaining, or, rather, independent, for it is made strong enough to carry hundreds of tons more than its own weight. This frame is open. Its interstices are filled in with brick and stone, material which here departs from its ordinary principal function of sustaining great loads, and whose new office is to act as a screen or a sheathing. The enormous mass of a building of this type may be entirely supported by a few steel columns; the brick and stone could be completely removed from any story without disturbing the floors above it. The entire upper stories, fifteen or twenty in number, could be left standing on a few comparatively slender steel pillars.

The new construction, in its use of cantilevers for distributing weight evenly, and in its rapid method of construction, has gone far to create the tendency of the day toward great height in buildings. A steel frame is raised with great rapidity. Steel derricks lift an entire truckload of steel beams at a very high speed, and so much of the work has been done, and is in process of execution, that a new trade, that of housesmith, has been evolved within the last few years. Many new methods, or new developments, concur to increase rapidity of construction. There is even discernible a sort of rivalry among cities as to which shall have the most impressive tall office building.

The justification of the construction of a tall office building, twenty to twenty-five stories in height, is sought for in the high price of land. It seems a truism, that a building twenty stories high gets twice as much out of the land occupied in the way of office area as a building does which is only ten stories high. But such truism does not exist, owing to the necessity for increasing the number of elevators as floors are added, so that twenty floors do not give by any means twice the area of ten floors.

There is one element in the problem of the maintenance of high buildings, one we have just alluded to, of which but little has been said, and which is in very definite need of solution, were such solution possible. It is the elevator problem. One of these great buildings is a concentrated city, and has to provided with rapid transit for its tenants, and for their clients and visitors. Due regard for the comfort of those using the elevators operates to impose a restriction upon their speed.

Already many elevators run so fast as to be very uncomfortable. The high speed is adopted to make each elevator do a better day's work. But in spite of high speed, the elevator service in some cases is proving inadequate. Twenty or more floors, each full of offices, are to be served, and even high speed elevators have to be disadvantageously multiplied for the work to be done. If insufficient in number, they go up crowded with passengers, and the discomfort is very great.

It is the last few stories that tell the most. A ten-story building is easily served; the problem becomes serious in one of twenty stories. So many passengers have to be carried to so great an average height that elevators have to be greatly increased in number.

It is here that the trouble begins. It would be very simple to put in a large number of elevators, and the expense of running them could be easily borne, but the room which they occupy is a more serious matter. In the case of buildings of large area, it is easy to surrender to the elevator shafts the less available portions of the building, such as the portion lying in the centre. Here offices cannot be placed advantageously for want of light and ventilation. But the tendency to erect exceedingly tall buildings on small areas intensifies the trouble. Practically every portion of the floor space may be of value, and each elevator destroys its own area on as many flo rs as it goes through.

As the height increases, the number of elevator shafts, penetrating the floors, and occupying rentable space, increases, and a balance will eventually be reached when the addition of floors would so magnify the elevator difficulty that more would be lost than gained by the increase in number. It is probable that this balance is reached now, if it has not been exceeded. Possibly the utilization for elevators of the least desirable portions of buildings involving the location of elevator shafts near the centre of blocks will effect a partial cure. Buildings standing on valuable land of small area have an immense sacrifice to make if elevators are placed within their available office area. In some cases less valuable land near the centre of the block might be specially utilized for the elevator system.

The Use of Cement in Freezing Weather.

The winter months present anew the question as to whether good work can be obtained with cement when the temperature is below 32° Fahrenheit, and, if so, what precautions are necessary to assure it. As opinions on this question are by no means coincident, we will endeavor not to be dogmatical in stating our own, but will attempt to point out a few useful precautions, and give the reasons for adopting them.

The subject is usually approached from one of three directions: either from, first, the theoretical standpoint, based on a knowledge of chemistry and physics; second, the standpoint of the experimenter, who makes test brick with hot and cold, salt and fresh water, and draws his conclusions from these alone; or, third, the standpoint of the one who loves to be called "practical," laughs at theory, and knows because he "has done it." A moment's unbiased reflection will show that pertinent information may be drawn from all these sources, and all are entitled to consideration.

When cement is mixed with water, a chemical action takes place, which we call the "setting," and, later, the "hardening" of the cement No chemical action would take place if we mixed cement with marbles or icicles instead of water. Likewise, if we mixed it with water, but exposed the mass to so low a temperature that the water froze before the setting of the cement, the chemical action would be no more energetic than as though we had used icicles in the first place.

In the practical use of cement it is always gauged with a larger quantity of water than is required for the chemical combination, and, if this excess water is frozen after the setting is somewhat progressed, the consequent expansion may be sufficient to disrupt the partially set mortar. If, by lowering the freezing point of the water, we can retain it in a fluid state until the processes of setting and hardening have so far advanced that the mass can successfully resist this tendency to expansion, we would expect that the mortar would not be greatly injured by the freezing.

It has been shown that, when mortar is brought into a warm room after having been maintained at a temperature of —15° C (+5° F.) for several days after gauging, it softens as it thaws, and then begins to set as though it had been but freshly mixed. It has also been found that the ultimate strength of the mortar is not greatly decreased thereby.

Large quantities of salt may be used with Portland cement without seriously injuring the mortar, and that considerable amounts may also be used with natural cements. Further, that since Portlands harden—that is, gain strength—much faster than natural cements, and require less water for their manipulation, the former are very much to be preferred for use in freezing weather.

Warming the materials—water, sand, and stone—may be an aid in getting the materials into place before freezing begins. Salt, as ordinarily used, serves no better purpose than this, because it is used too sparingly to prevent freezing. Water must contain 8 per cent. salt to prevent freezing as +20° F. It is evident that the brine ordinarily used containing from 2 per cent. to 4 per cent. salt will simply delay the freezing a short time if the thermometer is below 20° F.

The following rules for the use of cement in freezing weather are indicated by the foregoing:

1. Portland cement is much to be preferred.
2. As little water should be used as will permit a thorough incorporation of the materials.
3. The water, sand, and stone may well be heated to about 100° F., and in any case should be above 32° F.
4. Salt may be used in small quantities to delay freezing until the work is in place, or in larger quantities to prevent freezing until the cement has set and hardened sufficiently to resist the destructive tendency of the freezing weather.
5. The work should be protected from the frost as much as practicable for a few days.
6. If the work freezes as soon as in place, the structure should not be too heavily loaded, as the mortar may soften and settle slightly on the return of warmer weather. —*Municipal Engineering.*

Household Inspection of Plumbing.

The following questions are given by Mr. Reuben S. Bemis, inspector of plumbing of Providence, R. I., in his report for 1895, as likely to call the attention of house holders to points in their plumbing which should be carefully regulated:

Have you a plan of the system of pipes in your house?

Is all the plumbing work exposed to view or easily accessible?

Are the fixtures on the different floors placed over each other, so as to avoid horizontal soil and waste pipes?

Are all the pipes air-tight, as shown by a proper test?

Is the continuation of the house-drain outside of the house to the sewer or cesspool properly laid?

Does each water closet have a sufficient supply of water discharged with sufficient force when emptied completely to scour the traps and branch waste pipes?

Are all objects excluded from the water closet which are likely to obstruct the pipes?

When a fixture is not in use for some time, are arrangements made to prevent the water seals in the traps from being broken by substituting oil for water?

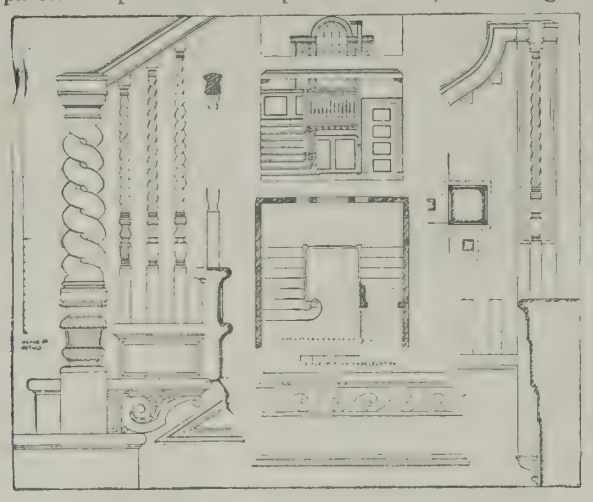
Are the traps so arranged as to resist siphonage?

Mr. Bemis also calls the attention of householders to the fact that the water in the traps of the plumbing is apt to evaporate when people go away and shut up their houses for the summer, and that this leaves an open entrance from the sewer to the house. The *Engineering Record* suggests that the drying of the pipes makes it possible for disease germs on their sides to float upward as dust, and get into the house, and into the systems of the occupants when they return in the fall, and Mr. Bemis suggests that the outbreak of typhoid fever so often following the return of people to their homes in the fall may be caused by this neglect of the plumbing.

M. MAUREL, the celebrated baritone of the Opéra, has published in the Paris *Temps* some observations on the artistic capacity of the Americans, as he has been able to judge of it during his professional tour in this country. M. Maurel, who seems to be a man familiar with such matters, says, charitably, that in painting and sculpture the Americans have a great future before them; while in architecture he thinks that they have already arrived at a high state of artistic development. It is true that the twenty-story office buildings do not please him much, but in the dwelling-houses of America, particularly in the villas in the suburbs of the great cities, he finds an originality, an artistic feeling, and delicacy of taste which delight him greatly. While American architects, like those of every other country, must avail themselves of what has been done before, he finds that blind copying, such, for instance, as that which dots the country districts of France with "frightful Swiss châlets," is not common here, and that an artistic feeling controls the arrangement even of familiar details.—*American Architect.*

STAIRWAYS OF MODERN HOUSES.

The illustrations of Old Colonial stairways published herewith are given as an example of the designs which A. Dickey & Co., 37 Bristol Street, Boston, are having prepared for publication in portfolio form, consisting of



OLD COLONIAL STAIRWAYS.

twenty-four plates. These designs are taken directly from the Old Colonial, Elizabethan Renaissance, etc., styles, showing the best application of them to modern requirements, with the best and purest details. With many years' experience in dealing with this subject, the firm recognize the need of a practical treatise to meet the demands of the architect and builder for a better class of work. They are aware of the fact that there are a number of books devoted to stair building, but they propose to get up a practical work, artistically illustrated with sketches, plans, elevations, and large size details, which will be of much value for every-day work.

Two trees, 125 feet from each other, at Gainesville, Ga., were recently struck and shattered by a single bolt of lightning.

How to Build a Chimney.

Simple as it may seem to build a brick chimney and top it out, it is seldom done in a first-class and workmanlike manner. In the first place, especially in wooden houses, the best and hardest brick are selected for the outside walls, or the underpinning, and the soft brick and bats are put into the chimneys. Any one with a practical knowledge of the requirements of chimney flues will at once recognize the folly of this method, says a writer in the *Brick-builder*. To be sure, they generally use good brick for the top, but it is up through the inside where there is danger of the fire eating through the soft brick and heating the timbers so that sometimes they become completely charred, and many disastrous fires have been traced directly to this cause. The use of tile flue lining, which we are glad to note is rapidly coming into general use, overcomes this evil to a certain degree. Many round tile are now placed in square flues, the tile being used for smoke, and the four corners of the flue for ventilation.

In topping out a chimney, there is a wide difference of opinion as regards the best materials to use as mortar. It has often been remarked that houses built in "ye olden times" had chimneys laid up with simple lime mortar, and when it becomes necessary to tear them down to make room for more modern structures, they have been found in a good state of preservation; in fact, it is often a hard matter to separate the bricks from the mortar. With a knowledge of this fact, many authorities claim that the masons' of to-day do not use as good mortar as the masons of long ago. Their opinion is certainly open to severe criticism. In the first place, they used wood as fuel almost entirely, whereas the common fuel to-day is anthracite coal.

As almost every one knows, the gases generated by the consumption of the fuel employed are the prime destructors of chimneys, decomposing and destroying the life of the mortar employed, and causing the softer bricks to chip and flake. Now, the gases thrown off from a wood fire are not strong enough to make any perceptible effect on a well constructed chimney; but when coal is the fuel we find a far different state of affairs, and just here we find the reason why the chimney built 100 years ago did not fall to pieces in a few years, like those of the present day. Having found that the gases, or condensation of gases, are the chief factors in the destruction of the chimney, we must employ those materials least susceptible to their ravages, and the experience of some of the most practical mason builders in the country has suggested the following rule: Use only the best and hardest brick throughout the entire chimney, laying them in best lime mortar to roof, and be particular to fill all joints full. Above the roof use mortar composed of 1 part lime and 4 parts cement, with sand enough to work smooth. The plainer the chimney top is in design the better. Saw tooth work and similar ornamentation should be avoided, and the largest chimneys should not be drawn out at the head more than 8 inches in each direction. Keep the inside of the flue straight and smooth. Change the bond in setting out the projections in the head to avoid the use of small pieces, or "Dutchmen." Do not make the top course smaller than the shaft of the chimney. On top of the brickwork put a stone coping, and fasten the dowels with melted lead, and on top of this coping put a flat, smooth stone, supported at each corner by small blocks of stone, whose height must depend on the size of the flue or flues. A strict observance of these rules will give as a result a well built, safe and durable chimney, which will not be affected by the weather or gases nearly as soon as those built in the ordinary manner.

The value of the wooden system of fireproofing has been strongly affirmed by experiments in Vienna, where a careful test was recently carried out. A lattice column, formed of two 2¾ inch x 5½ inch channels, was erected and inclosed in brick and mortar so as to form a pier 18 inches square and 11½ feet high. A load equivalent to 3½ tons per square inch was placed on the column. Inside the iron column were placed test bars of various alloys, with melting temperatures of from 150° F. to 1650° F. The column was inclosed by a brick chamber, 8 feet x 12 feet base, and 11½ feet high, within which a fierce fire was maintained for a space of two and a half hours, when it was extinguished by the fire brigade. After the structure had cooled off, it was found that the ironwork was "quite uninjured," and that not even the test bar capable of fusing at 150° F. showed any signs of melting. The only effect on the brickwork was that about 1½ inches of the exterior edges had crumbled away.

E. T. Barnum, Detroit, Michigan, has just received contract to supply another county with their well-known steel lattice jail cells, viz., Wythe County, Virginia.

The above manufacturers are furnishing, in connection with their well known line of wire, iron and brass work, a large number of these cells to cities, towns and villages from the Eastern seaboard to the far West. Catalogues giving full description of all their goods sent free upon application. No builder can afford to be without one.

Stain on Brick Walls.

One of the most reasonable objections to the erection of sightly buildings of brick of late years has been the white stain that defaces the walls and mars the symmetry of the building. Climate appears to have no influence on this flouring of the red brick walls, for it has been noticed in northern Vermont and Baltimore, and in walls erected under the torrid sun of summer, and the chilly airs of late autumn, and the frosts of winter. Some builders say the trouble is in the mortar, the lime of to-day is not pure; the limestone contains salt, has been exposed to the atmosphere of absorbed acids. Of course, it is ridiculous to say that live lime contains acids absorbed from the atmosphere, for, in that case, it could not be lime. Others say that there is a fine coal mixed with the clay to facilitate the burning, and that this coal exudes the sulphur contained in it, which, in contact with the lime, which is an alkali, makes an efflorescence that becomes white as soon as it appears on the surface and is exposed to the oxygen of the atmosphere.

All these theories appear well in statement, but the value of knowledge is to know how to prevent or how to cure. If impure materials used in the making of bricks is the cause of this defacement of otherwise clean brick walls, the brickmakers should look to it that they hold a proper place in our architecture, else wood will reassert itself, and a sheep pasture, with a passable stone quarry on it, will be more valuable than beds of clay. If the burners of limestone, and the handlers of it when ready for the market, are at fault, they will find that it costs to be careless, and will pay to be honest.

But it seems to be an unsettled matter what is the cause of this defacement of the walls of our brick buildings of recent erection. Something of an experiment on a large scale has recently been made, in Hartford, Conn., on the walls of an extensive and costly building having two fronts. At great expense, workmen have been employed for several weeks carefully going over the entire face of the building, washing the whiting off with acidulated water, and then following with a wash of kerosene oil. The contractor believes so firmly in this treatment that he had the painters, or "pointers," follow, and finish the joints of the bricks. It is to be hoped that the remedy will prove effectual; but what is needed is not a remedy, but a preventive.—*Pittsburg Dispatch.*

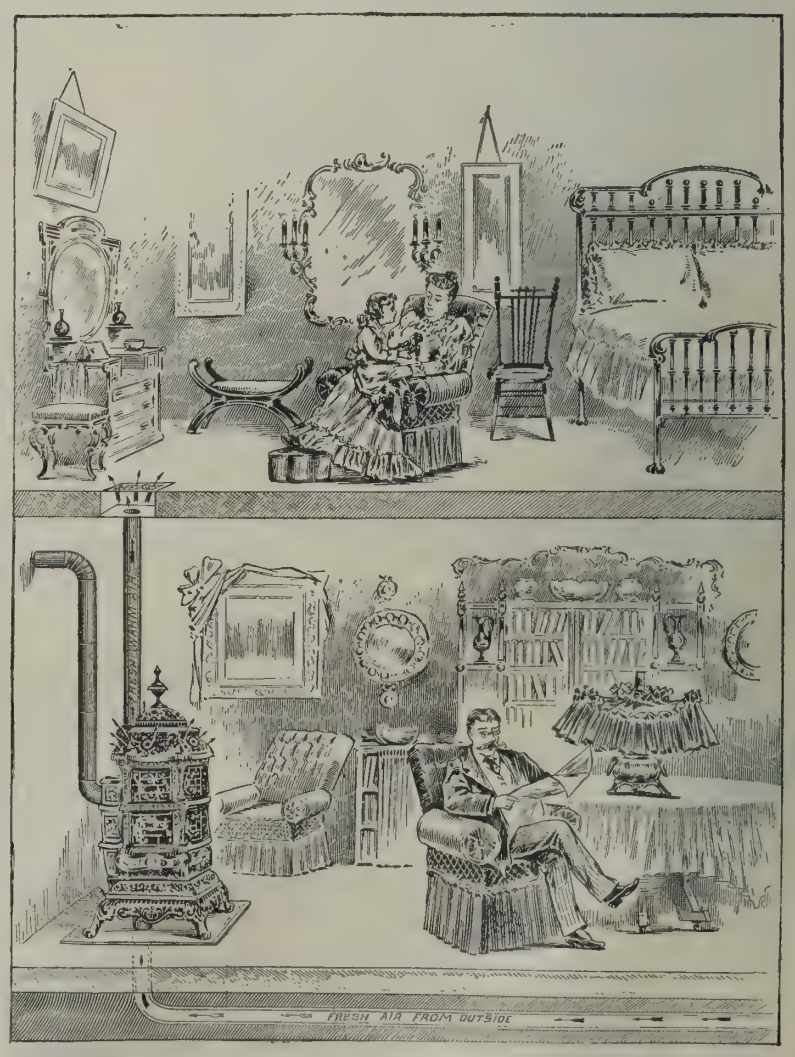
Mack's Plaster System for Buildings.

Among the large German firms of the building line, showing important progress in building, and exhibiting objects of special interest to architects, contractors, and manufacturers of building material, at the Berlin Industrial Exhibition, were the patent plaster board factory of A. & O. Mack, Ludwigsburg and Berlin. With a complete house constructed from plaster material, and called the "Workman's Dwelling of the Twentieth Century," Messrs. Mack gave a speaking illustration of the application of their much appreciated "Mack's plaster boards," and of a newly invented plaster manufacture called "Mackolith." The latter is an absolutely weatherproof, fireproof, and very well isolating building stuff, especially for outside walls, cellars, bathrooms, kitchens, etc. The use of Mackolith combined with that of Mack's plaster boards enables the erection of cottages for workmen and subalterns, country seats, factories of every kind, military barracks and hospital barracks, etc., within six to eight weeks, at any season, in an absolutely dry condition, and ready for use.

Electric railroads are proving of great benefit to farmers in all parts of the country. The trolley lines run out from the large cities and towns to villages far removed from steam railroad communication, and in several districts arrangements are making to run trolley milk trains, vegetable trains and the like, to enable the farmers to get their produce quickly to market. It is even proposed to run trolley coal trains, to supply coal to small towns that now use only wood.

THE CORTLAND HOWE VENTILATOR.

The great disadvantage of the ordinary stove is that it gives no ventilation. It heats and reheats the air of the room, and because of this physicians very often condemn stoves as a means of heating a residence. The stove is economical in the use of fuel, more so than any other system. The furnace, on the other hand, brings in warm outdoor air, but is wasteful of fuel, and gives no radiant heat in the room. Much warmth is lost in the cellar, and in the ascending hot air pipes, and so the fuel consumption is much higher than necessary. A combination of the two systems is made in the Cortland Howe ventilator. This consists of a stove with furnace connections, as shown in the cuts. A cold air box, bringing fresh air from outdoors, enters at the bottom of the stove. Tubes running upward warm the air to the temperature desired for healthful heating. A connection also carries heat to the room above, the ventilator having the power to heat two or more rooms in coldest weather. The heater is indorsed by professors in the leading colleges, and also has been awarded highest honors at Chicago Fair, '93; California Fair, '94; Franklin Institute, etc.



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Catalogue will be forwarded by Edwin A. Jackson Bro., 50 Beekman Street, New York City.

SCIENTIFIC AMERICAN.

Building Edition.

ALEXANDER HALL - PRINCETON UNIVERSITY.

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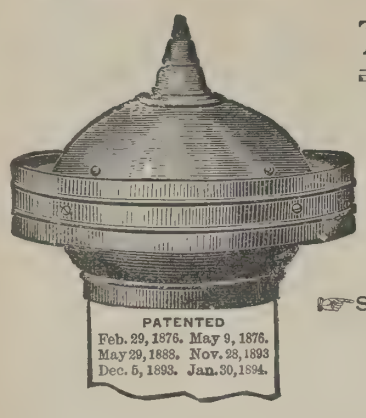

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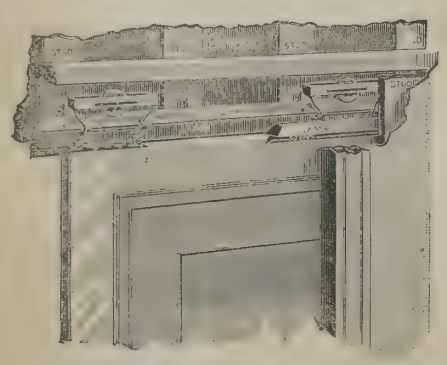

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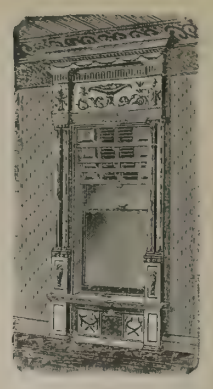

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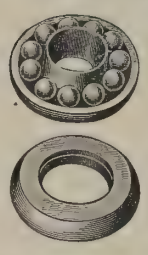

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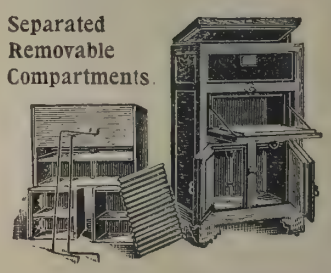

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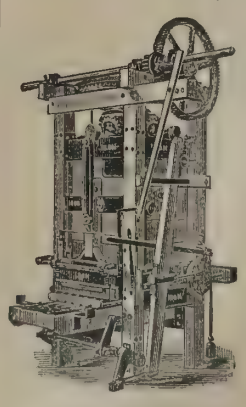

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PARLOR LOOKING INTO HALL.—ROW OF MODEL DWELLINGS AT SCRANTON, PA.—See page 57.

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No. 361 BROADWAY, NEW YORK.

NEW YORK, OCTOBER, 1896.

THE

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SCIENTIFIC AMERICAN, BUILDING EDITION.

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ECONOMY IN THE USE OF BUILDING MATERIALS.

It takes but a glance at the buildings of bygone ages to convince us that the art of construction was originally a matter of guesswork. The mason and the carpenter put into the various parts of their work as much material as seemed to them sufficient for the duties these parts had to perform. If the work stood, well; if it collapsed, they simply built more stoutly the next time. If a race of builders were imaginative and daring, they used the minimum amount of material that experience had taught them was sufficient for its purpose, as we plainly see in some of the slender piers and tapering spires of the French cathedrals; if, on the other hand, they were cautious and conservative, there was a tendency to put into a building an amount of material far in excess of its structural necessities, and there was a prodigal waste of stone and timber.

Breaking beams, bulging walls, and foundations that cracked and settled provided a mass of experimental facts out of which were evolved the rules of thumb, which, even to-day, are as near an approach to theory as many a master builder or foreman ever makes. It is only within the last half century that the exact nature of structural stresses has come to be fully understood, and their calculation reduced to a system. This, however, has now been done so effectively that the calculation of the stresses in framed structures, or in the various parts of a stone or wooden building, is so simple as to be within the powers of the graduate of any good technical school or night class.

Side by side with our improved theories of the stresses there has come a more thorough knowledge of the strength of building materials. This has resulted from the invention of the testing machine, and the establishment of testing laboratories, which are prepared to inspect and report on any specimen of building material which may be submitted. The strain sheet and the testing machine go hand in hand, and it is their mutual co-operation that has rendered economy in the use of building material not merely desirable, but imperative, and has made possible those daring feats of modern engineering and architectural construction which fill the lay mind with wonder.

Among the many objections that are being raised, and justly so, against the exaggerated height of the sky-scraper office building, it must not be forgotten that it has rendered valuable service to the builder's art, by raising it, as far as the calculation of its structural strength is concerned, to that high level of scientific exactness which characterizes all engineering construction. Before the ground is broken for the erection of a skeleton steel building, the amount and strength of its various parts have been carefully determined. Specimens of the steel that goes to form its girders and columns have been carefully tested, as have the weight, durability, and crushing strength of its building stone, and just sufficient material is put into its various parts to insure that they shall not be subjected to a greater stress than is called for by the specifications.

But, while this is true of the larger buildings, it is to be feared that the great mass of smaller structures, such as city stores and dwellings of moderate height, and suburban residences, especially such as are put up by the smaller building firms, and by foreman builders and carpenters who have started business on their own account, are, many of them, built on guesswork rule-of-thumb lines. The result of this is that the material will often be badly disposed: in some parts of the building too much being used, in other parts too little. The speculative builder, whose sole object is to make the last possible cent out of his venture, will cut down his material to what he thinks will be the smallest safe margin; with the result that at times he will exceed the margin, and a catastrophe will follow. The honest builder (and we believe he is in the large majority) will probably err on the side of strength, and be lavish in his use of material. Every foot of timber or stone so used that is in excess of the requirements, however represents a positive waste; and, though it may seem to be a small item in the individual building, it represents a big annual loss when it is figured out for the country at large.

Let us take the case of the use of timber, in its relation to the lumber industry and the rapid disappearance of our forests. The recent Government tests of American timber have shown that it possessed a greater—in some cases a much greater—strength than was generally supposed. Up to the time of these tests the tables contained in the engineering text-books had been drawn up from tests of a limited range, and of more or less imperfect execution. As a consequence, they were received with more or less distrust by engineers and builders. The result of this was that motives of self-protection led the designer to select the larger rather than the smaller figures, and his structures were more bulky than reasonable safety demanded. Moreover, as a rule it will be found that the man who works by rule-of-thumb will use more material than the designer who works by careful calculation. As an instance of this, it may be mentioned that the timber railroad trestle (a survival of early railroad methods) is frequently spoken of as "light," "rickety," "dangerous"; whereas, it has recently been shown by parties interested in the preservation of our forests that the amount of materials in these trestles, if they were more judiciously designed, could be largely reduced.

Here, then, is a single instance in which millions of feet of lumber could be annually saved, if the actual strength of our splendid timber were known, and if it were disposed to better advantage for the work it has to do. Intelligent designing would work a similar economy, if applied to city and domestic architecture; more particularly, as carried out by those smaller firms founded by ambitious journeymen who are seeking to better their condition. If such a firm set out to build two stores, one to be devoted to the sale of feathers and flowers, and the other to handle hardware, it is almost certain that the floors of the first building will be heavier than is necessary, and the fear of not providing sufficient strength for the heavy loads of the second building would probably lead to an excessive use of material in this also.

The system of tests recently undertaken by the Government should be carried out in the most exhaustive manner, not merely in timber, but all classes of natural building material. These tests should find a corner in the pocket-book of every carpenter and builder in the country, and, along with these, he should possess a knowledge—it would be easy to attain—of the simple rules by which these tables may be applied to calculate the strength of the joists, girders, and posts of a building.

A MODEL RESIDENCE AT OVERBROOK FARMS, PA.

We present to our readers in this issue, on page 60, a model residence recently erected for Messrs. Wendell & Smith, at Overbrook Farms, Pa. The engravings illustrate a design of unusual beauty in treatment, and executed in the modern style, with a mixture of Colonial and Gothic detail. The spacious piazza, tower, dormer and latticed window effects are all good features, and another striking feature is the combination, which provides an interior arrangement equally as pleasing as the elevations. The building, from stone foundation to first story windows, is built of rock-faced Chestnut Hill granite. The remainder of the building is built of brick, coated with plaster, and then pebbled dashed. The body is painted Colonial yellow, while the trimmings are painted white. The roof is shingled, and left to weather finish. Dimensions: Front, 51 ft.; side, 36 ft., not including piazza. Height of ceilings: Cellar, 7 ft.; first story, 9 ft. 6 in.; second, 9 ft.; third, 8 ft. 6 in. The entrance doors are broad, with windows on either side. Lobby is paneled in chestnut. Hall, trimmed with chestnut, is provided with a paneled wainscoting and a staircase of handsome design, with paneled seat and latticed window. Reception room is treated in China gloss. It contains an open fireplace, with tiled hearth and facings, and a Colonial mantel. The library is a spacious apartment, with sliding door connection to reception room. This apartment and dining-room are trimmed with chestnut; the latter is provided with an octagonal projection at one end, and china cabinets at the other, which form a similar projection at the opposite end. Kitchen and pantries are wainscoted and trimmed with yellow pine, and finished natural, and are provided with the usual fixtures complete. The second floor contains five bedrooms, bathroom, eight closets, and a large, open hall; these apartments are trimmed with chestnut. Bathroom is wainscoted, and furnished with the best modern fixtures and exposed plumbing. Third floor contains three bedrooms and trunk room complete. Cemented cellar contains laundry and cold cellar. The house is lighted by electricity and heated by steam from a central plant. Messrs. Yarnall & Goforth, architects, No. 14 South Broad Street, Philadelphia, Pa.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

Designed by a Blind Architect.

The Perkins Institution for the Blind, at South Boston, is to have a new dormitory, and the wonderful part of it is that the plans for it have been drawn by one of the blind attachés of the institution, Dennis A. Reardon. The building will have a frontage of 25 ft., and will be 60 ft. deep and four stories high. It will be built of brick and light sandstone, and it will be ready for occupancy, it is expected, by next June. It is said to be the first case in the world where a blind man has drawn the plans for a public building. Mr. Reardon has been totally blind from boyhood, and received all his training in the Perkins Institution.—*Railway Review.*

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A ROW OF MODEL DWELLINGS AT SCRANTON, PA.

We present herewith on this page, and on pages 55 and 58, engravings showing a most unique example for a model row of dwelling houses, recently erected for Conrad Schroeder, Esq., at Scranton, Pa. The plans of the four houses are similar, therefore we present only the plans of the first house, with description. The dwellings have several good features, including spacious piazzas, bay windows, and the sloping roof with its ornamental dormers. The underpinning is built of local bluestone. The pillars at piazzas are built of buff brick. The superstructure of wood is covered on the exterior with clapboards and shingles, the former being painted Colonial yellow with white trimmings, while the latter is finished natural. The roof is covered with shingles and finished similar. Dimensions: Front, 18 ft.; side, 60 ft., not including piazza. Height of ceilings: Cellar, 7 ft. 6 in.; first story, 9 ft. 6 in.; second, 8 ft. 6 in.; third, 8 ft. 6 in. The lobby and hall are trimmed with poplar and finished natural. The reception hall is trimmed with similar wood, and it contains an ornamental staircase turned out of similar wood, with carved newel posts and spindled balusters. The archways between hall and parlor are provided with transoms, filled in with ornamental spindlework, and the main archway is provided with a colonnaded effect. The parlor is treated with white and gold in a dainty manner. It contains an open fireplace furnished with tiled hearth and facings, and a mantel made from special design. Dining-room is trimmed with poplar and is finished in mahogany. It contains two china closets and nook for buffet. Kitchen and pantries are trimmed with North Carolina pine, finished natural, and these apartments are furnished with the best modern conveniences. The second floor is trimmed with poplar, and it contains sitting-room, two bedrooms, closets and bathroom, the latter paved and wainscoted with white enameled tiles, and provided with porcelain fixtures and exposed plumbing Third floor is treated in colors, and contains four bedrooms. Cemented cellar contains furnace, laundry, and other necessary apartments. Cost $13,500 complete. Mr. Percy J. Morris, architect, Scranton, Pa.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

VIEW OF HALL STAIRCASE.—A ROW OF MODEL DWELLINGS AT SCRANTON, PA.

MAUSOLEUMS.

We presented on page 9, in the July issue, some illustrations showing the modern mausoleums as built at Woodlawn Cemetery, and we continue to illustrate, on page 68 in this issue, other mausoleums of a similar character and of a purely classic order, and also a few monuments.

The first engraving on the page is the mausoleum erected for Messrs. Henry Hurlbut and William H. Scott, and was designed and built by Mr. H. G. French, of Twenty-third Street and Fifth Avenue. It was taken from the Ionic style of architecture, and the distinguishing characteristic is the columns with the volute capital. Although the forms are different, the main features are the same as shown in the Wood mausoleum, which was also designed and built by Mr. French, and treated in the Doric order. The Ionic order has more mouldings, its forms are richer and more elegant, and as a style is lighter and more graceful than the Doric, although the latter is more severely classic than the former. The most perfect specimens of the Ionic order are to be found at the Acropolis at Athens, and the Coliseum at Rome. It is built of Westerly granite, and is covered with Mr. French's patent stone roof, consisting of three roof stones, twenty-three feet in length and weighing forty tons, the centre stone lapping over the ones on either side, as shown in the engraving. The walls, floor, and ceiling of the interior are of red granite and highly polished. It contains sixteen catacombs.

The second engraving shows the Wood mausoleum, already mentioned, which is the most chaste and purely classic of any of the tombs illustrated. It is treated in the Grecian Doric order of architecture, the earliest and most simple form of a columnar edifice. Its most distinguished feature is the simplicity and harmony—simplicity in the long unbroken lines which bind the form, and the breadth and boldness of every part; harmony in the evident fitness of every part to the rest. It is built of Westerly granite; the walls and ceiling of interior are of polished red granite; it contains sixteen catacombs. It is provided with polished bronze doors.

The Butterfield and Falconer mausoleum, illustrated in the third engraving, presents a tomb of similar architecture to the Wood mausoleum, very beautiful in style and execution, but not so chaste and classic as the former. It is constructed of Maine granite, with frieze and columns of similar stone and partly polished. The special feature is the resting place in front of the tomb, provided with seats and platform. Another feature is the solid bronze trimmings, and the inscription, "VBI-EST-MORS-VICTORIA-TVA," over the entrance way, which is quite an appropriate one The interior contains twenty catacombs, and the floor, walls, and ceiling are of pure white Italian marble and handsomely polished. The late Mr. Charles Atwood was the architect.

Another monument worthy of note is the one shown in the next illustration, and which has been erected for Joseph Bird, Esq. The design is most artistic, and is an excellent reproduction of a monument in the cemetery at Milan, Italy. It represents a full-sized figure in marble resting on a cross of rock-faced stone of a reddish brown color, and the general effect conveyed is that it has the appearance of being erected at random. Messrs. Lazzari & Burton, of Woodlawn, N. Y., builders and designers.

The next illustration is the Babbitt monument, and, although it is not an exact copy of any monument, it is treated in the style of the Italian Renaissance. It has the form of a sarcophagus, highly ornamented with drapery, cherubs' heads, and a richly carved frieze. The lower part of the monument consists of three bases and a die. The material is white Westerly statuary granite, with the exception of the two lower bases, which are of dark Quincy. This monument was designed and built by the New England Granite Works, Hartford, Conn.

The last illustration represents a very chaste Corinthian column standing on a massive granite base and supporting a figure. The whole is most excellently executed, and it presents a most artistic example for shaft work.

Our engravings were made direct from photographs of the mortuary, taken specially for the SCIENTIFIC AMERICAN.

A DWELLING AT MOUNTAIN STATION, N. J.

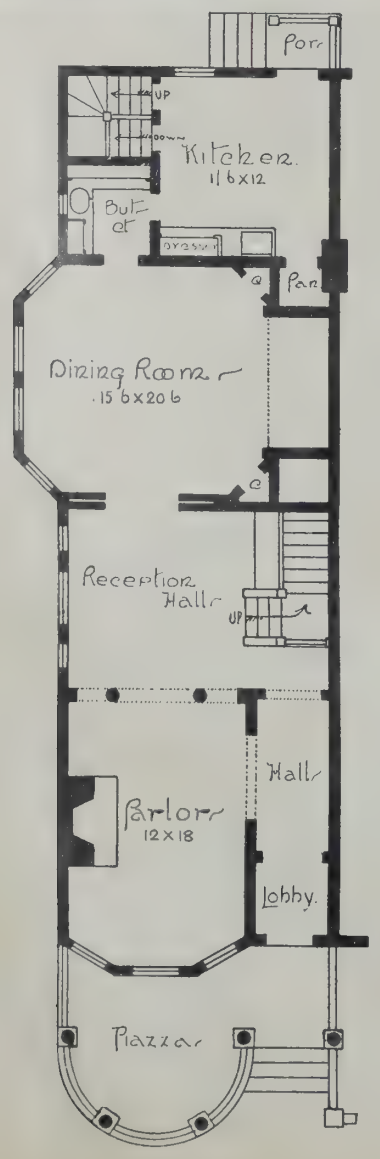
We publish herewith, on page 65, a dwelling recently completed for Mr. Wallace, at Mountain Station, N. J. Underpinning, brick. First story, clapboards. Second story, shingles. Painted Colonial yellow, with ivory white trimmings. Roof shingled, and finished natural. Dimensions: Front, 44 ft. 6 in.; side, 44 ft. 6 in., not including piazza. Height of ceilings: Cellar, 7 ft.; first story, 9 ft. 6 in.; second, 9 ft.; third, 8 ft. 6 in. The hall, parlor, library, and dining-room are trimmed with ash in a neat manner. The floors are laid with yellow pine, in narrow widths. Hall contains an ornamental staircase, with a spacious landing, which is lighted by a cluster of stained glass windows, with excellent effect. Parlor and library each have open fireplaces, furnished with tiled hearths and hardwood mantels. Dining-room has a similar fireplace, built of brick, with hearth and facings of unglazed brick tiles, and an oak mantel, with columns. Kitchen, pantries and laundry are trimmed and wainscoted with yellow pine, and finished natural. These apartments are fitted up complete. Bathroom is treated similar. The second and third floors are trimmed with whitewood. The second floor contains five bedrooms, large closets, and bathroom, and the third floor contains three bedrooms and trunk room. The bathroom is wainscoted, and fitted up complete. Cemented cellar contains furnace and other necessary apartments. Cost $7,000, including furnace, stained glass work, and everything complete. Mr. J. J. Marsh, architect, Orange, N. J.

Our engravings were made direct from a photograph of the building, taken specially for the SCIENTIFIC AMERICAN.

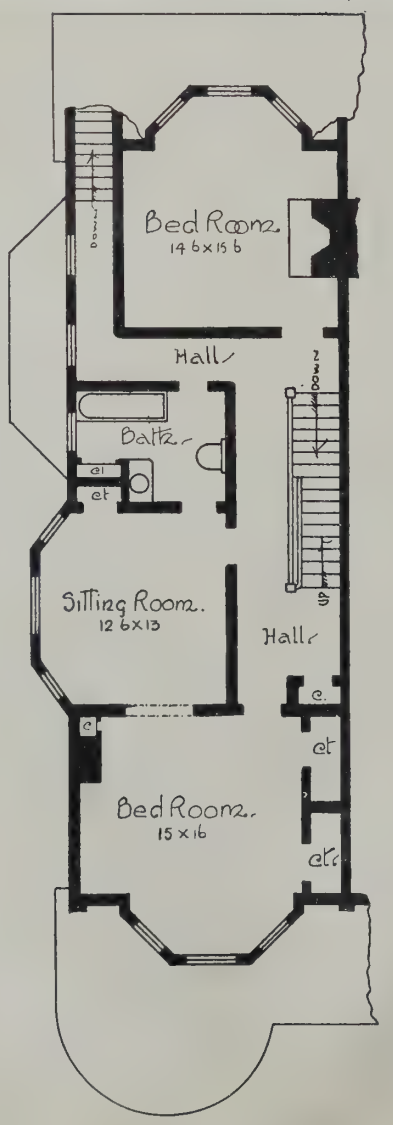
LIEUT. SEMLY'S RESIDENCE.

Our presentation on page 59 portrays a very effective design, embracing wood and stone. The dimensions, without piazza, at front, 38 ft.; side, 35 ft. 8 in. Heights: About 10 ft. 6 ins. in first story, 9 ft. 6 in. in the second, and 7 ft. in the cellar. The second story is proportionately paneled vertically, squared below the sill course in natural wood finish, with a contrasting intermingling of shingled panels under the windows, connecting with stone beneath. A happy combination of color being formed from the buff-colored roof shingles, the umber tint of wood finish at sides, and gray stonework at base, carefully pointed, with raised joints. The semi-round porch at the side gives breadth to the design, while the entrance porch appears inviting, and is comfortably fitted with seats at the side, as shown. The chimneys above the roof are of red brick, capped with buff terra cotta. Upon entering you find in effect the hall and living-room as one, to which may be also added the parlor, if desired, making a commodious and convenient grouping of rooms. Staircase has a flat arch at the side supported by a fluted column, corresponding to turned hardwood newel post opposite. Stairs are paneled at sides. Circular arch to parlor, which is elliptically formed at one end with fireplace, cleverly designed and centred therein. Living-room has cheerful fireplace, and direct exit to side porch. Dining-room cozily furnished with open fire also, and china closet specially designed for corner. Kitchen and butler's pantry provided with large dressers, and usual culinary and plumbing fixtures complete. Back stairs from kitchen to second story, with cellar stairs passing under. The cellar also has area stairs to outside, side of the "ground closet." In the second story there are four good-sized chambers, with ample closet-room, and two smaller ones for children. Bathroom has usual attic stairs at side in the hall. The owner and resident is Lieut. Semly, Chevy Chase, Md. Architect, I. D. Meline, Chevy Chase, Md.

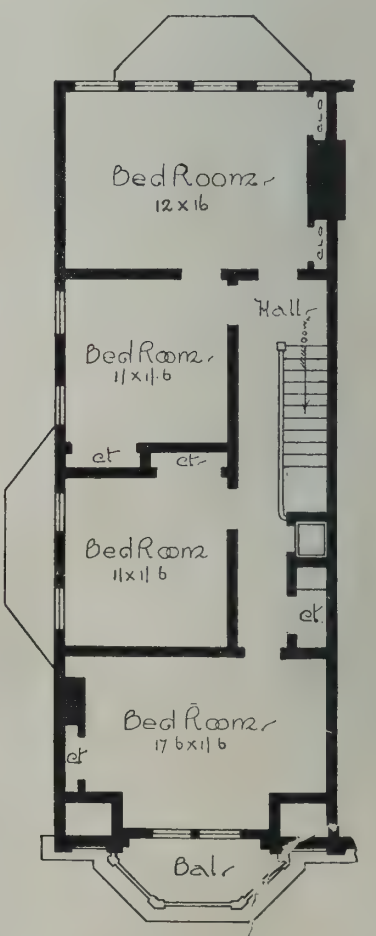
Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.



First Floor



Second Floor



Third Floor

A ROW OF MODEL DWELLINGS AT SCRANTON, PA.—See page 57.

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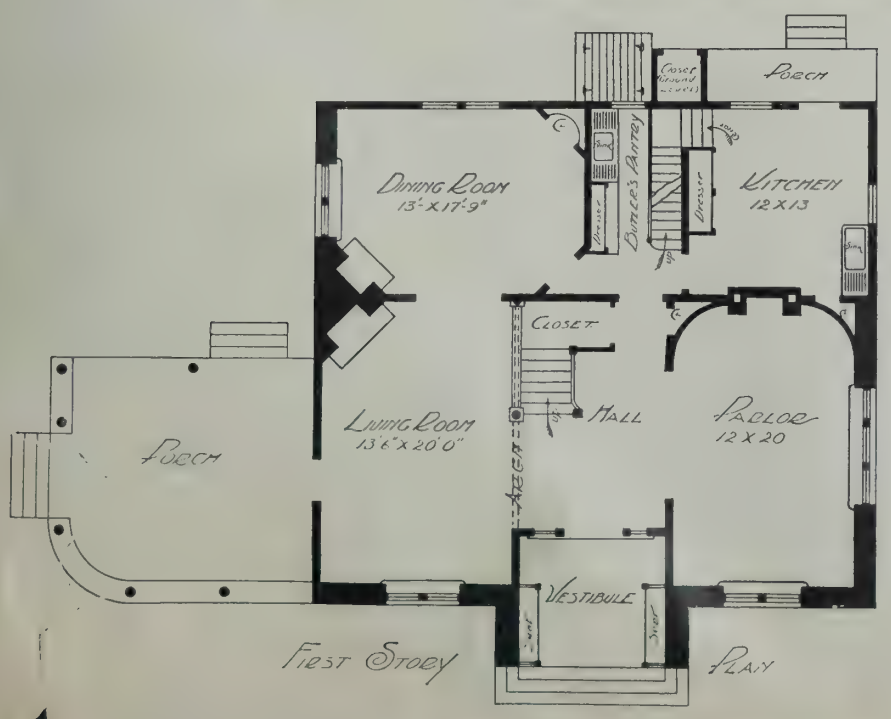
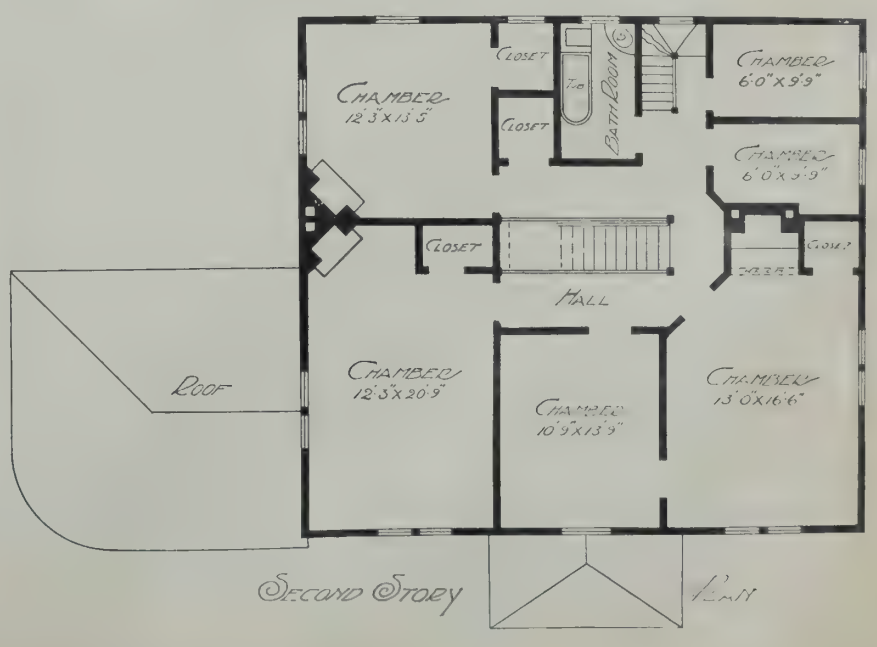
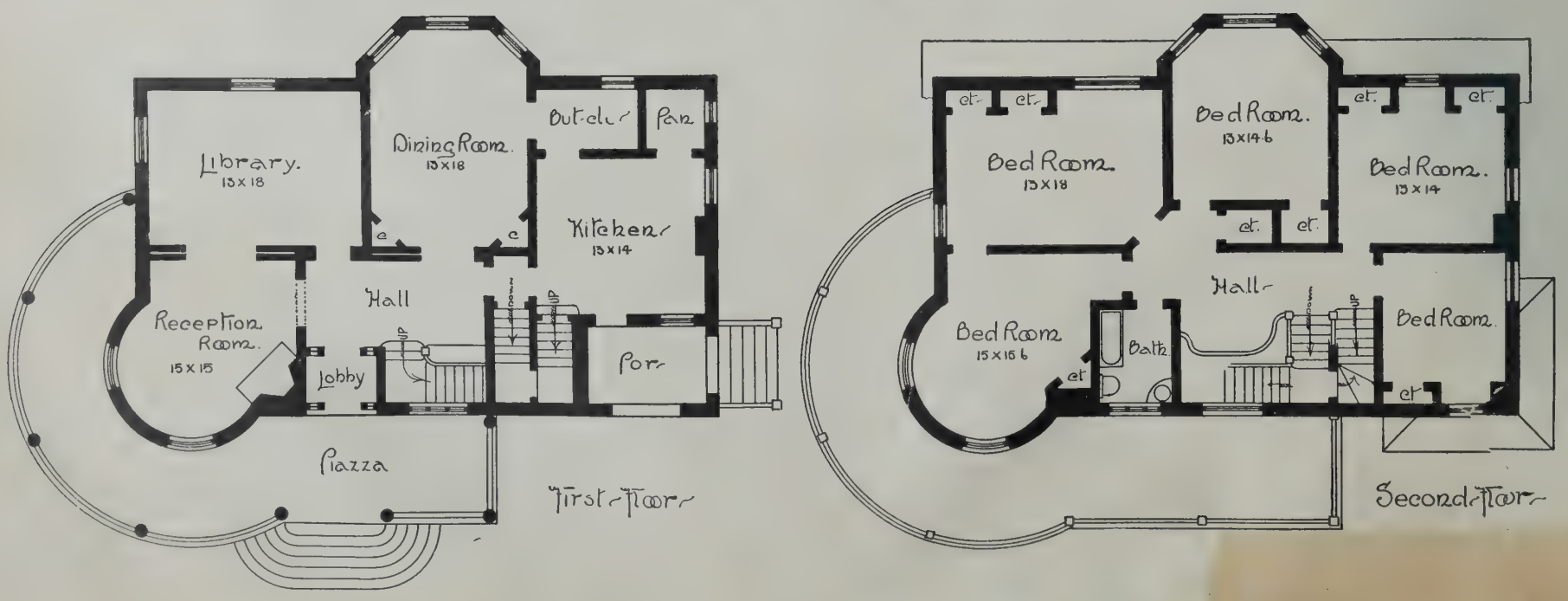




LIEUT. SEMLY'S RESIDENCE, CHEVY CHASE, MD.—See page 57.



A MODEL RESIDENCE AT OVERBROOK FARMS, PA.—See page 56

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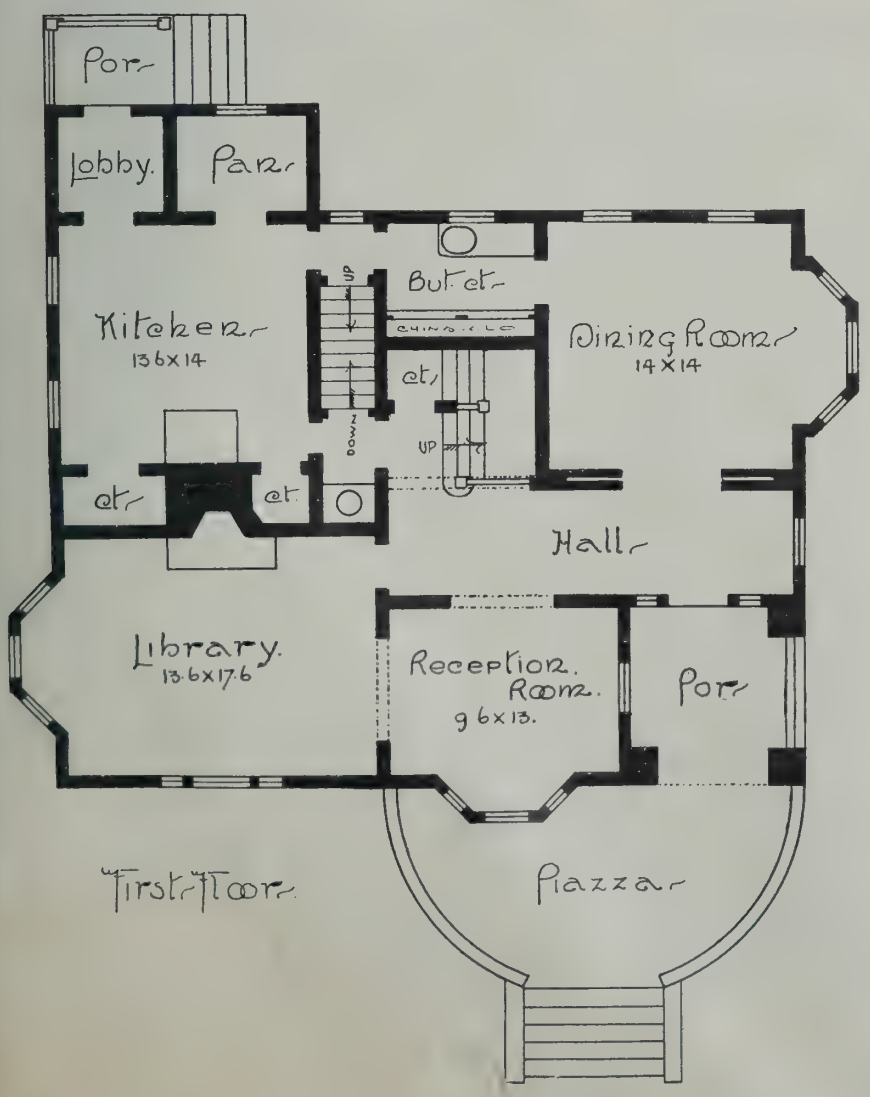

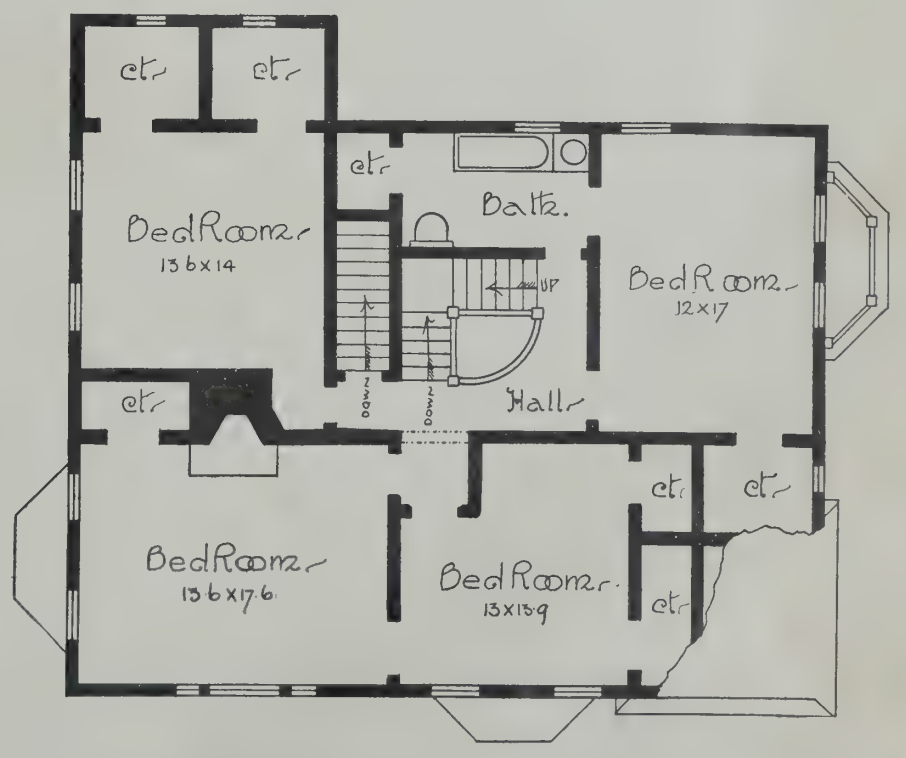

A MODERN DWELLING AT BROOKLINE, MASS.—See page 69.

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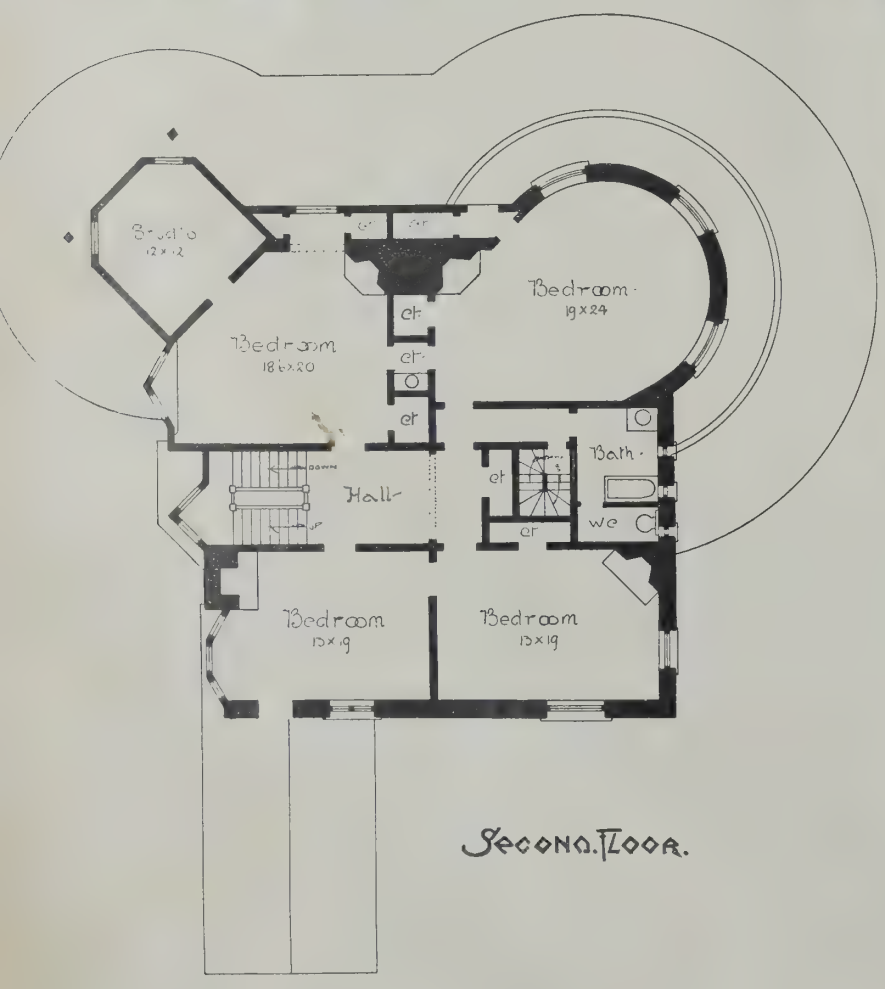
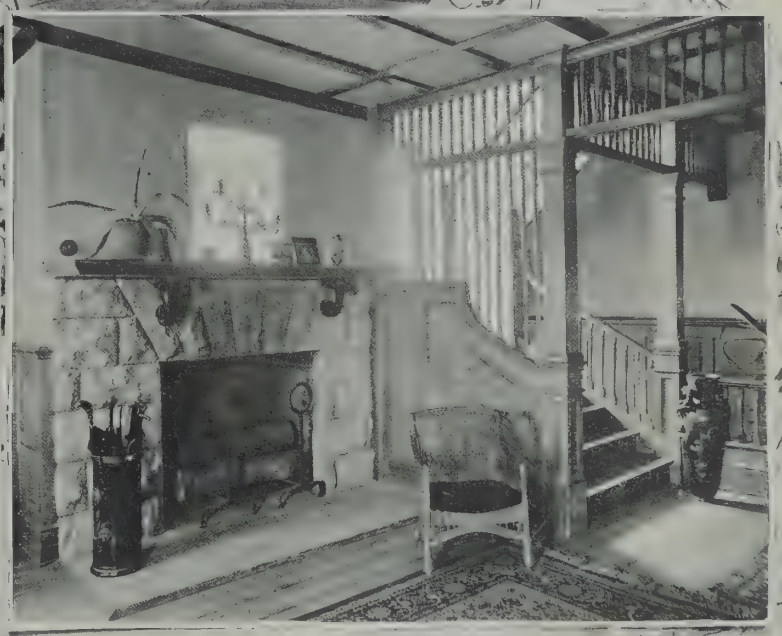
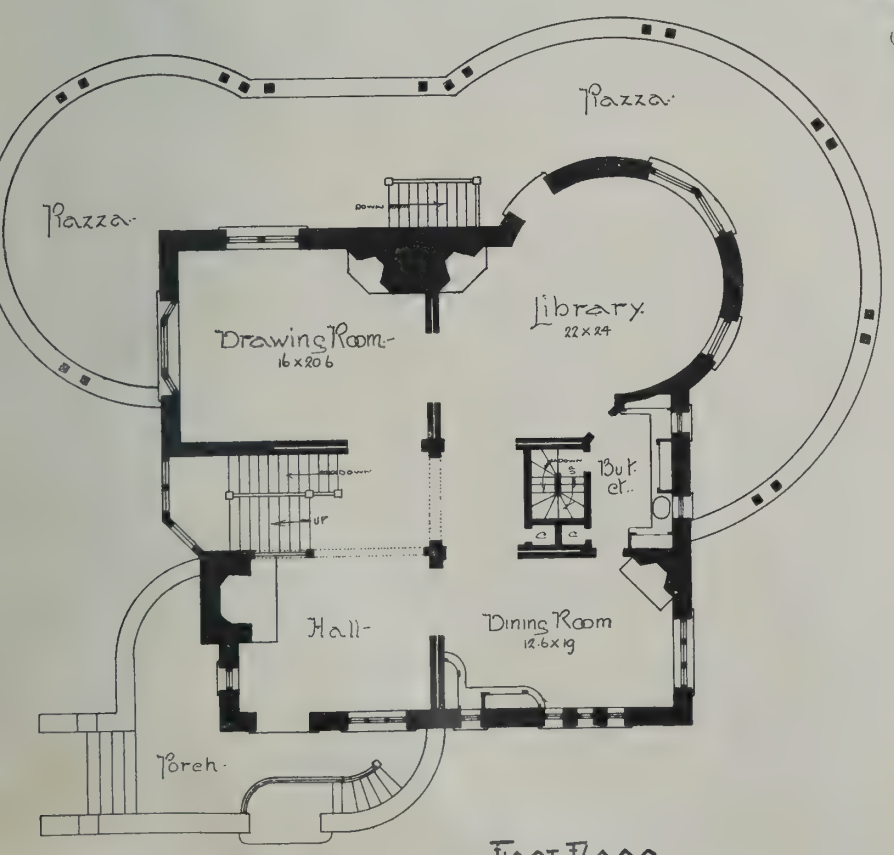


SECOND FLOOR.

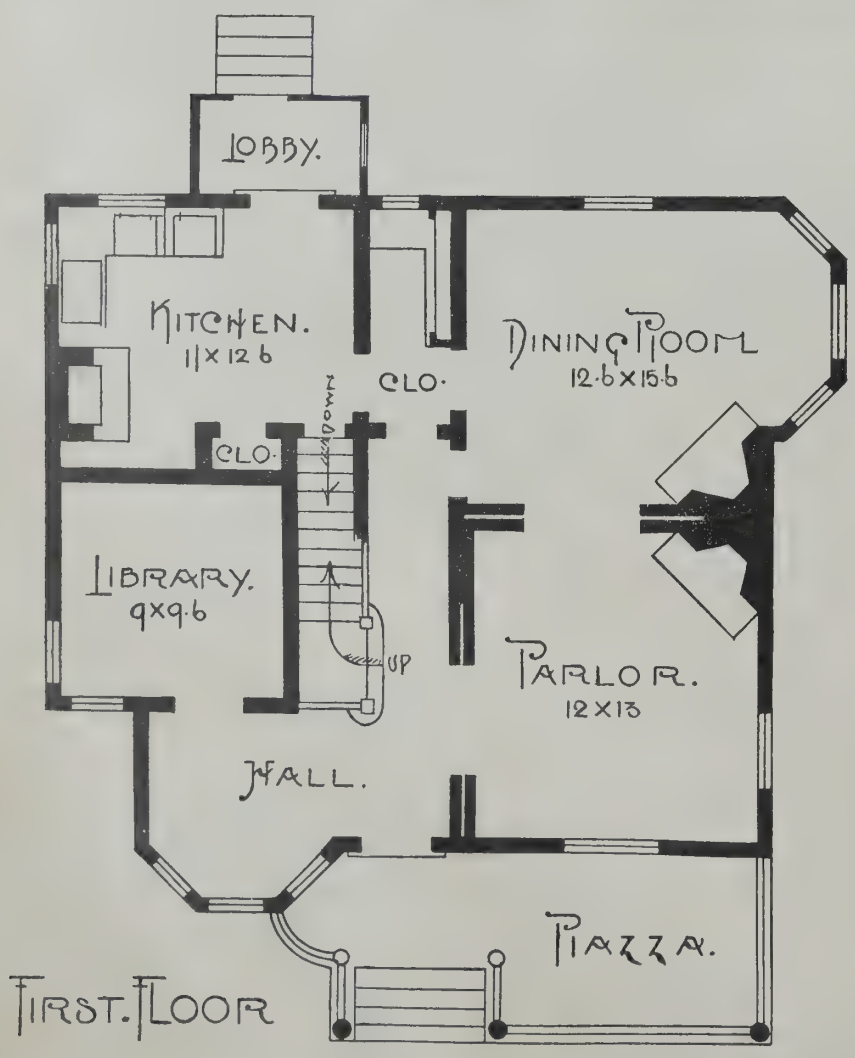
A SUBURBAN RESIDENCE AT PARK HILL, N. Y.—See page 69.

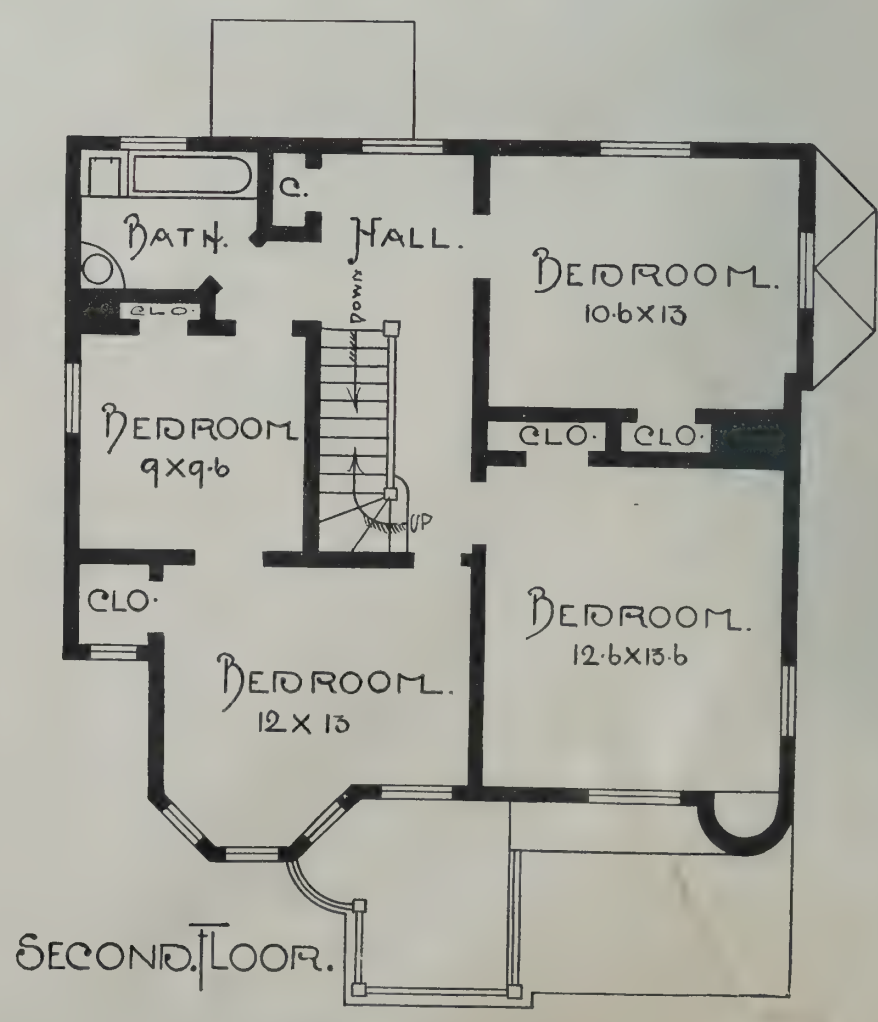




FIRST FLOOR.

A SUBURBAN RESIDENCE AT PARK HILL, N. Y.—See page 69.





A DWELLING AT MONTCLAIR, N. J.—See page 69.

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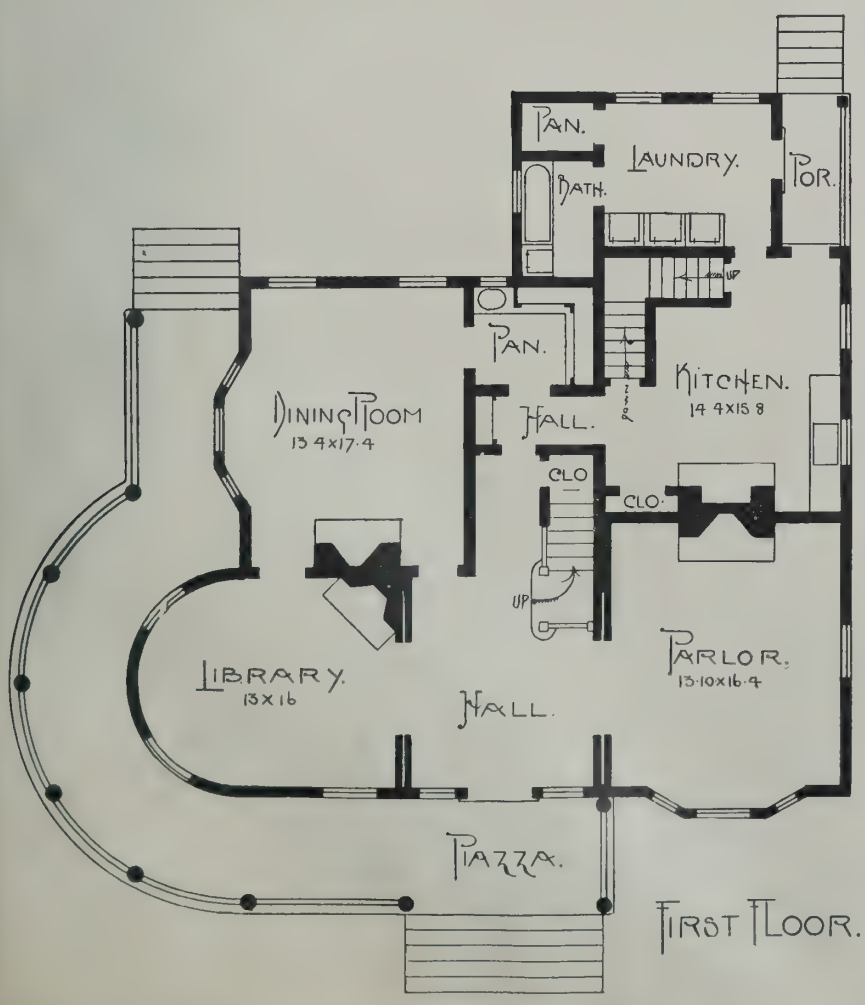
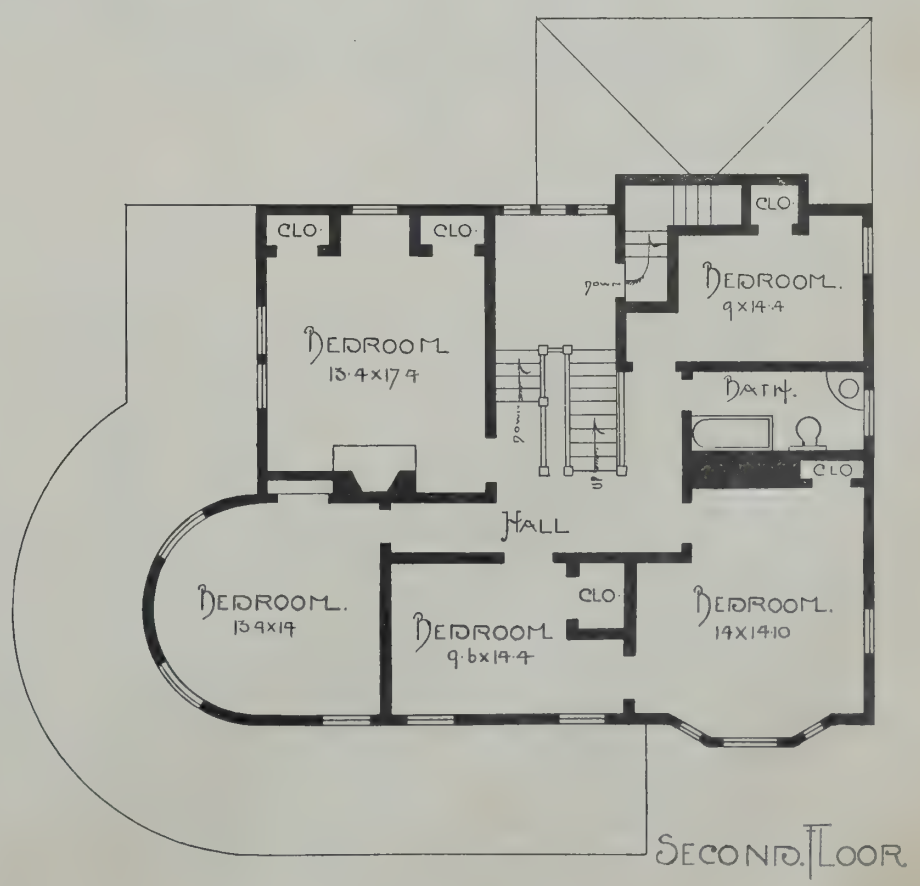
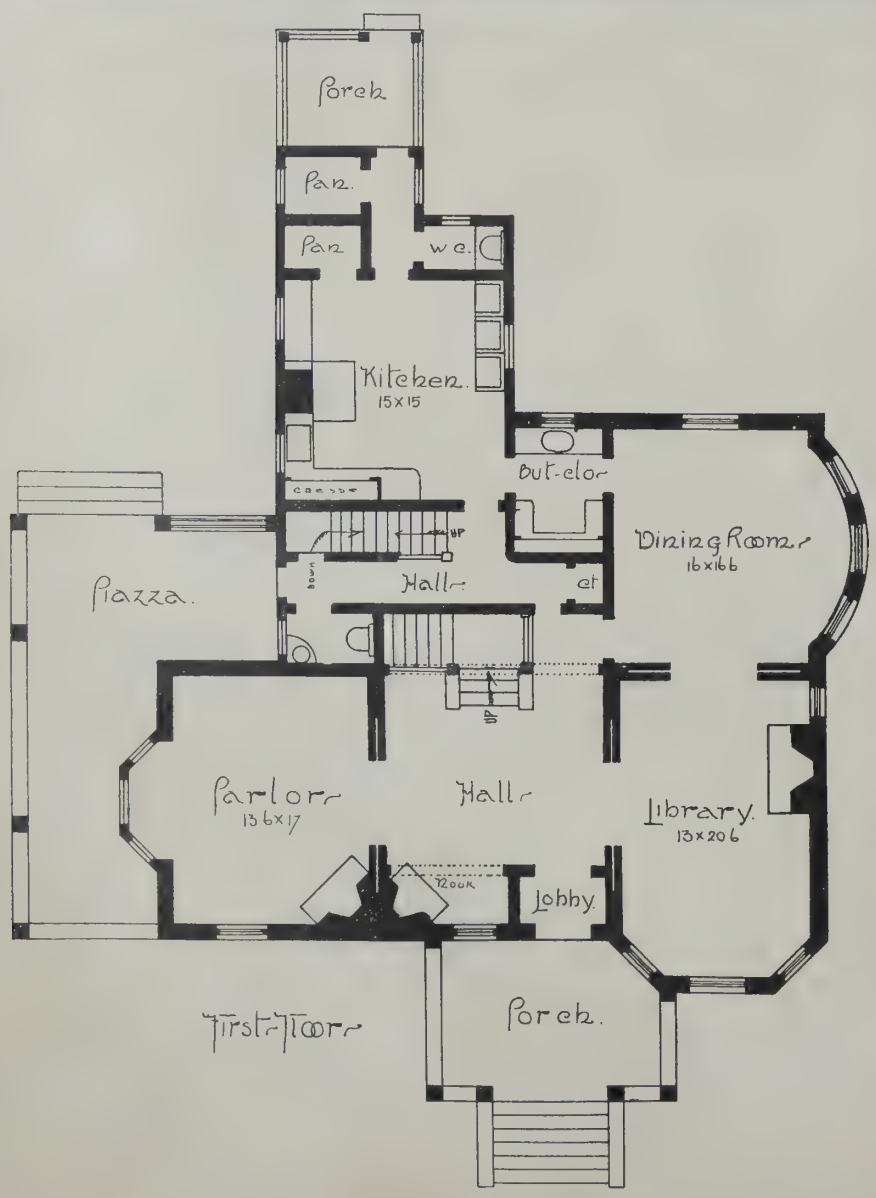
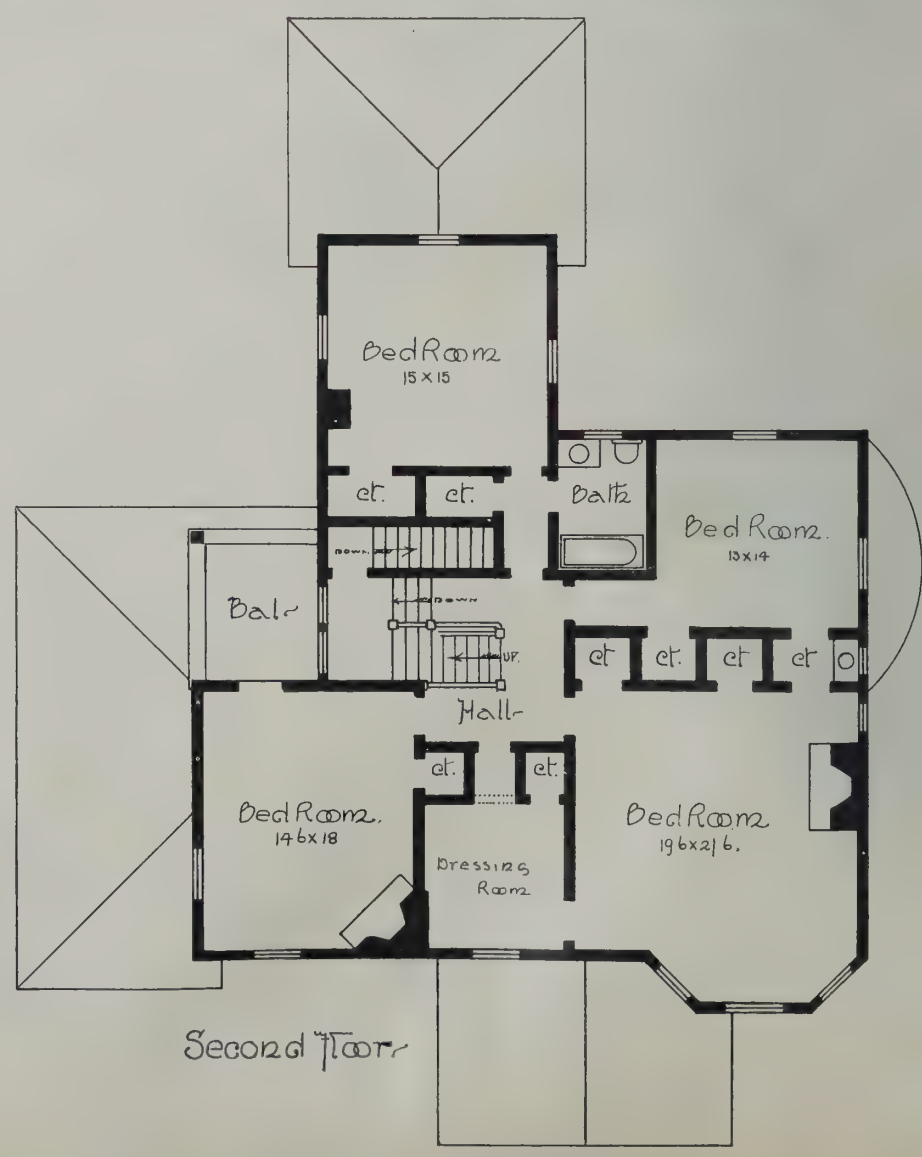




A DWELLING AT MOUNTAIN STATION, N. J.—See page 57.





A SUBURBAN DWELLING AT SOUTH ORANGE, N. J.—See page 69.

First Floor Plan

Second Floor Plan

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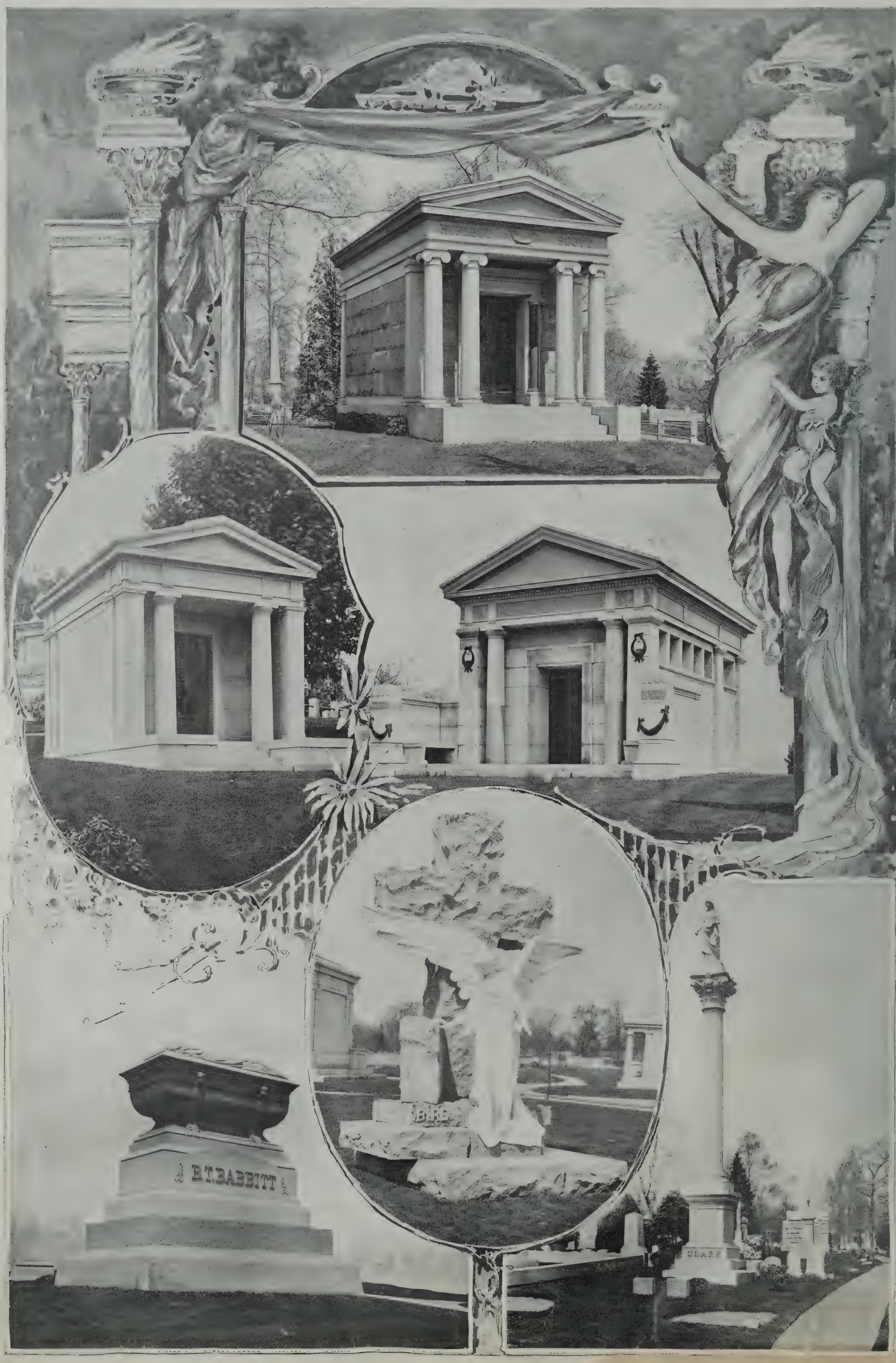
A HOUSE AT SUMMIT, N. J.—See page 69.



MAUSOLEUMS—See page 57.

ALEXANDER HALL, PRINCETON COLLEGE, PRINCETON, N. J.

Our colored plate on front page presents an illustration of Alexander Hall, at Princeton College, Princeton, N. J. Alexander Hall, which is designed to be used as Commencement Hall, is a gift from Mrs. Charles B. Alexander to Princeton College, and is one of the finest memorial buildings given to any university in this country, and, we might say, in the world. The illustration which we present herewith shows the south and east fronts. The building is treated in a purely Romanesque style of architecture, and is constructed of an effective combination of rough-faced red granite for the main wall and a rich brown sandstone for the trimmings. The roofs are covered with red English tiling. The towers at each angle of the building are very successful features, the two at front rising to a greater height than the two at the rear, thus giving a uniform and graceful slope to the roof lines. The front wall contains a rose window in the centre, which is glazed with stained glass of unusual beauty in color and design, and was made by Tiffany, of New York. Under this window is a group of figures, handsomely carved, and at either side are similar panels. The front entranceways are very massive in form, and are flanked on either side by a cluster of columns, with massive carved caps, supporting archways. The most unique and novel feature is the ambulatory, which surrounds the building, and is fifteen feet wide and one hundred and fifty feet in length. This is an unusual feature in buildings of this character, and it was a most happy thought of the architect. The main vestibules, and also ambulatory, have tiled mosaic floors. The four towers contain stairways to galleries. The interior of the building is quite as successful as the exterior, and has much more of the interest of novelty, because it comes not with an attempt to do something, but from the effort to do something which, in reality, is artistic and substantial, and to meet the desired requirements. The whole color scheme is excellent. The arches are supported on pillars and columns of stone, and the main interior walls are lined with brick. The rostrum is square in form. The face of the platform, and the side and rear walls, are built of Sienna marble, finely grained, and rich in colors. Above this marble work are panels laid in mosaic, and it may be of interest to American artists to know that this mosaic work, which is the finest example of its kind, was executed by American artists, after a competition with Italian and French artists. These various panels represent learning throughout the ages, and are very appropriate in their respective relations. The interior has been decorated with sculpture, under the direction of J. Massey Rhind. Beneath the rose window is a seated figure of Learning, on one side of which are allegorical figures of Architecture, Sculpture, Painting, Poetry, Music, and Belles-Lettres; on the other one, Oratory, Theology, Law, History, Philosophy, and Ethics. The rostrum is provided with a speaker's platform, in the centre of which is the President's chair. The seats for the Trustees and Faculty are placed in a semicircular way at the rear of the rostrum. At the right of the rostrum an organ is built in, and from which musicales can be given to the students when desired. The body of the auditorium and galleries are fitted and hewed plainly and solidly in oak. Mr. William A. Potter, of 160 Fifth Avenue, New York, was the architect.

Our plate was made directly from a photograph of the building, taken specially for the Scientific American.

A SUBURBAN RESIDENCE.

We present herewith in this issue, on pages 62 and 63, a residence recently completed for E. K. Martin, Esq., at Park-Hill-on-Hudson, New York. The building is situated on a very prominent site, with a commanding view of the Hudson River and surrounding country. The engravings present a very artistic and picturesque design, treated in the Dutch and Swedish style of architecture. The towers, chimneys, bay-windows, and the broad, low piazza, are the principal features of the exterior. The underpinning and the larger part of the exterior wall is built of rock-faced granite, laid up at random. The remainder of the building is shingled, and left to finish a silver-gray color. The roof is shingled, and is finished natural. The trimmings are painted bottle green. Dimensions: Front, 48 ft.; side, 48 ft., not including piazza. Height of ceilings: Cellar, 9 ft.; first story, 10 ft.; second, 9 ft. 6 in.; third, 9 ft. The first floor is trimmed with red oak. The hall has an oak floor, paneled wainscoting, ribbed ceilings, and an open staircase, with columns extending to ceiling. The space between these columns is provided with spindle transoms. This staircase is lighted by leaded glass windows, glazed with cathedral glass of delicate tints. The open fireplace is built of rock-faced granite, with a tiled brick hearth, wood mantel-shelf, and wrought iron trimmings. The drawing-room is treated with China white, and it has an open fireplace, with cream tiled hearth and facings, and a dainty mantel made from a special design. Library is finished natural, and it has a similar fireplace, with mantel to match trim. Dining-room has a paneled wainscoting, beamed ceiling, an ornamental china cabinet, built in, with leaded glass doors, and an open fireplace, built in same as ones already described. The butler's pantry is well fitted up with bowl, closets, drawers, and stairs to basement and to third floor. The second floor is trimmed with cypress, and it is finished natural. It contains four bedrooms, studio, large closets, and bathroom; the latter is framed and wainscoted with white English tiling, and is fitted up with the usual fixtures, with exposed plumbing. The third floor contains two bedrooms and ample storage. Basement contains billiard-room, breakfast-room, pantries, kitchen, laundry, furnace-room, and cellar store, all fitted up with the best fixtures replete. Mr. A. F. Leicht, architect, 103 Cedar Street, New York.

Our engravings were made direct from photographs of the building, taken specially for the Scientific American.

A DWELLING AT MONTCLAIR, N. J.

We present herewith in this issue, on page 64, a dwelling recently erected for G. W. Fisher, Esq., on Midland Avenue, Montclair, N. J. The design is unique, and it combines both attractive elevations and well arranged plans, and is built at a moderate cost. The foundation is built of stone, and the underpinning of similar "rock-faced" stone, laid up at random. The first and second stories are sheathed and clapboarded, while the third story is shingled, and the whole painted French gray, with cream trimmings. Roof shingled. Dimensions: Front, 33 ft. 6 in.; side, 29 ft. 8 in., not including front piazza. Height of ceilings: Cellar, 7 ft.; first story, 9 ft.; second, 8 ft. 6 in.; third, 8 ft. The interior throughout is trimmed with whitewood, finished natural. The doors and windows have heavy moulded casings. Hall contains an ornamental staircase, turned out of similar wood and finished natural. Parlor and dining-room are well lighted and ventilated, and the library is so arranged as to be isolated from the remainder of the house if desired. The fireplaces are furnished with tiled hearths and facings and hardwood mantels. Kitchen and pantries are wainscoted with narrow beaded stuff, and are furnished with the usual fixtures in the best possible manner. Second floor contains four bedrooms, large closets and bathroom, while the third floor contains two bedrooms and trunk-room. Bathroom is wainscoted and furnished complete. Cemented cellar contains furnace and other apartments. Cost, $3,453; furnace, $160, and mantels, $65. Total, $3,678. Mr. Christopher Meyers, architect, 361 Broadway, New York City.

Our engravings were made direct from photographs of the building, taken specially for the Scientific American.

A MODERN DWELLING AT BROOKLINE, MASS.

We publish herewith in this issue, on page 61, a modern dwelling recently completed for D. H. McKay, Esq., at Brookline, Mass. The design is of unusual beauty in style of architecture, English Gothic, and the principal detailed feature is the gable end, with its ornamental verge boards. The lines are well broken by many bay windows and other projections. The underpinning is built of blue granite. The superstructure is built of wood, and the exterior framework is sheathed, papered, and covered with shingles, and then painted a mahogany color, with white trimmings. The roof is covered with shingles and painted red. Dimensions: Front, 48 ft.; side, 40 ft., exclusive of piazza. Height of ceilings: Cellar, 7 ft.; first story, 9 ft. 4 in.; second, 8 ft. 10 in.; third, 8 ft. 6 in. The interior arrangement is most excellent, and is finished in a handsome manner. The main hall is treated in China white. It has a paneled wainscoting and an ornamental staircase, with spindle balusters, and a newel post formed of a cluster of similar balusters, and set into a mahogany rail. The reception room and library are treated with China white, and each has a bay window; the latter contains an open fireplace built of brick, and furnished with tiled hearth and facings, and a mantel of artistic design. The dining-room is trimmed with quartered oak, and is provided with paneled wainscoting. The butler's pantry is well fitted up with drawers, shelves and china cabinets. Kitchen and pantries are trimmed and wainscoted with North Carolina pine, and are fitted up with the best modern conveniences. The second floor is trimmed with whitewood, finished natural. It contains four large bedrooms, closets and bathrooms, the latter wainscoted and furnished with porcelain fixtures and exposed plumbing. Third floor contains three bedrooms and trunk room. Cemented cellar is provided with furnace, laundry, and other necessary apartments. Mr. S. J. Brown, architect, Boston, Mass.

Our engravings were made direct from a photograph of the building, taken specially for the Scientific American.

A SUBURBAN DWELLING.

We present, on page 66, a unique design for a suburban dwelling, which has been recently erected for Maxwell Smith, Esq., at South Orange, N. J. The design is treated in the modern style, and is a mixture of English and Spanish architecture. The underpinning and first story are built of brick laid up in red mortar; the second story is constructed of wood, and covered with shingles, and painted a pinkish gray color, with white trimmings. The roof is shingled and left to weather finish. Dimensions: Front, 51 ft.; side, 55 ft. 6 in., not including piazza. Height of ceilings: Cellar, 7 ft.; first story, 9 ft. 6 in.; second, 8 ft. 6 in.; third, 8 ft. The hall is one of the principal and most artistic apartments. It is trimmed with oak, and contains a lobby with a tiled floor, paneled wainscoting, nook with seat and open fireplace, furnished with tiled hearth and facings, and staircase with massive carved columns extending to ceiling, and supporting arch and transom. The parlor is treated in a dainty manner with ivory white and gold, and it contains an open fireplace with hearth and facings of Pompeian brick, and a mantel of excellent design. Library is trimmed with sycamore, and is provided with an octagonal projection at front and an open fireplace. Dining-room is trimmed with oak. The circular bay window gives a graceful sweep at one end of room. A good feature is the isolation of the kitchen from the main house. The rear hall is well located, and the toilet is a convenience. Kitchen and pantries are well furnished with the best modern fixtures, and are trimmed and wainscoted with whitewood, finished natural. The floors are laid with narrow beaded yellow pine. The second floor contains four bedrooms, dressing-room, closets and bathroom; the latter wainscoted and fitted up with the best modern fixtures, with exposed plumbing. The third floor contains two bedrooms, trunk-room and billiard-room. Cemented cellar contains furnace and other apartments. Messrs. Rossiter & Wright, 94 Liberty Street, New York, architects.

Our engravings were made direct from photographs of the building, taken specially for the Scientific American.

A HOUSE AT SUMMIT, N. J.

On page 67 we present a house at Summit, N. J. This is a framed building, the walls being double sheathed and covered with clapboards. The roof is shingled; a piazza occupies three-fourths of the front and entire side of building on first story; a portion of the front having circular columns carrying the balcony on second story. To the rear are large circular columns running through two stories and supporting the overhanging roof, which forms a canopy for balcony below. The large main hall, which is entered from the vestibule, is centrally located, with reception-room, library, and dining-room opening on it through sliding doors. At the rear end is a large open fireplace, with seats on either side, and a handsome carved mantel; the staircase continuing on above. Two windows in front, with large skylight in roof, give light to hall and stairs. The dining-room is reached from kitchen through butler's pantry and rear hall, which also communicates with main hall, and by means of rear stairs second story is reached. There is a large kitchen pantry and dresser, with storeroom and coat closet adjoining. The floors of hall and main rooms are in quartered oak. The staircase, paneled wainscot, and trimming of hall and reception-room are in quartered oak. The library and dining-room in San Domingo mahogany. Large open fireplaces are built for burning logs. On the second floor are two principal chambers, a guest chamber, sewing room, large dressing room, and two bathrooms, the latter containing bath, wash basins, and water closets. Each room is provided with one or more closets, and a large linen closet opens from rear hall. The mantels and trim are hardwood, and floors throughout doubled. The attic, reached by rear stairs, is well lighted and arranged for servants' rooms, storage, etc. The walls are plastered hard finish and hack plastered. The rooms are well lighted with large windows and bays, from which extensive views can be had of the surrounding country. The entire cost is $18,000. The architect and designer was L. R. Hazletine, New York City.

Our engravings were made direct from photographs of the building, taken specially for the Scientific American.

A Lasting Paint for Glass.

A durable and effective method of painting glass is described as follows, says the *Railway Review*: The glass is cleaned thoroughly with acidified water and fossil meal, and a solution of 10 parts of stale beer and 1½ parts of potash water glass is poured over it. After drying, the glass is heated moderately and as uniformly as possible, when it is ready to receive its coat of paint, for which the following prescription is given: 100 parts (weight) of Cologne glue are allowed to soak in cold water for several hours. The water is then poured off, and the glue is put into a pot and melted. While the glue is melting, 200 parts of linseed oil is heated until the temperature of both substances is about equal. As soon as no more air bubbles can be observed in the glue, the linseed oil is added gradually under continual stirring. The mixture has to be kept hot over a slow fire for an hour and stirred without interruption. For stirring, a round stick is the best, as an angular one will produce bubbles. Then 200 parts of slightly heated turpentine or camphor oil is added, and at last the coloring substance, and 150 to 200 parts of water. All these additions have to be made slowly, while stirring must not be neglected. The paint is spread on lukewarm, and is dry within six hours.

CURIOUS HOUSES.

Dr. Vander Heyden, a Dutch physician, living in Japan, has recently erected a specimen of a constant temperature dwelling at Yokohama. Externally, it consists of double plates of glass set into iron frames. Its walls, which also are formed of transparent and tight boxes, are filled with a chemical composition, probably a chloride, that allows the luminous rays to pass and prevents the exit or entrance of calorific rays. It was immovable. It is a perfectly combined cage of remarkable elasticity.

The principle of it might be recommended to countries subject to earthquakes; for example, to unfortunate Sicily, whose volcanic shocks are incessantly renewing lugubriously historic disasters.

The house, as a whole, has a volume of 5,000 cubic metres, and weighs 120 tons, say about twenty-four kilogrammes to the cubic metre inclosed. We willingly

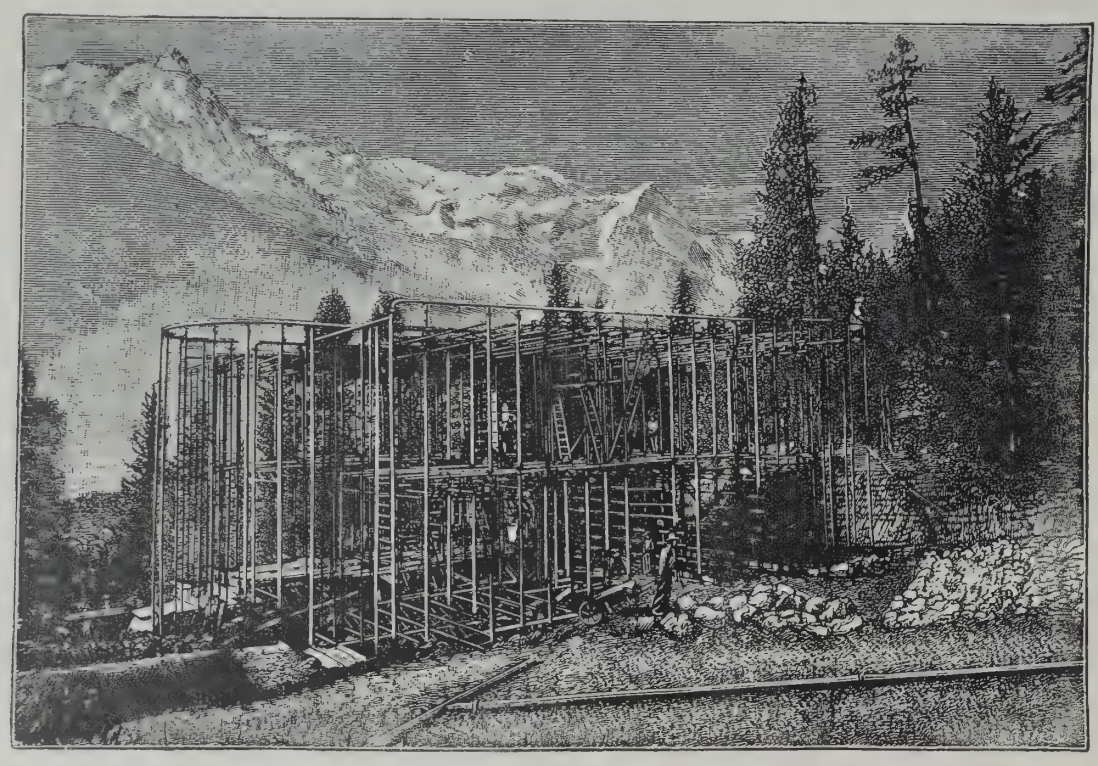


Fig. 1. METHOD OF CONSTRUCTION OF A TUBULAR HOUSE AT CHAMONIX.

extreme heat that Dr. Vander Heyden wished especially to combat.

Another curious house has been erected by Mr. Caron, at Chamonix. It consists (Fig. 1) of a tubular framework, with a circulation of water, and forming a heat radiator of wide surface in winter, a radiator of cold in summer, and, at the same time, a water conduit. If it is desired to have warm water in cold weather, or cool water in warm, it is only necessary to turn a cock in this assemblage of tubing, which recalls the safety apparatus designed to combat fire in the friezes of our theatres.

The idea is certainly original. We should, perhaps, have hesitated to speak of it, had not Mr. Caron, passing resolutely from theory to practice, erected his tubular habitation, as a defiance to severe winters, at the foot of the great mountains of Chamonix, over which extends a white sheet of eternal snow.

As shown in Fig. 1, which is reproduced from a photograph, the structure consists of a framework of metallic tubes, forming a double envelope. All the floors, ceilings and walls communicate with each other. The walls are of wood, and formed of boards nailed to joists that are connected with the tubes by iron collars.

The water circulates freely throughout this intercrossing of pipes, first in the interior system of the ceilings and floors, and then in the exterior wall.

In summer, the water that circulates under pressure is derived from mountain springs. It cools the interior walls, gradually becomes warm, and then passes into the external partition, where it becomes still warmer, carrying off in its refrigeration the discommoding calories. In winter, it first passes into the spirals of a heating apparatus, where it becomes hot, and then, following the route that we just mentioned, it abandons its calories outside and in.

The velocity of circulation is so regulated that the water makes exit from the house with a temperature equal to or less than that which it had upon its entrance. The rendering of transmission should be equal to 1, if the manœuvring of the feed cock is properly done. The only heat lost, or not utilized rather, in the warming, is that necessary for the draught.

Upon the whole, Mr. Caron has realized a large low temperature heating apparatus, having a wide heating surface of 300 square metres. When this apparatus operates, the water enters at 3.5 deg., becomes heated to 65 or 70 deg., and makes its exit at 4 deg. Its builder and owner asserts that he is warmed perfectly, and this is very likely the case. He claims, too, that in this curious structure he has found the following advantages, aside from those that consist in having cool air in summer and warm in winter. In the first place, the rapidity of construction is remarkable. Begun on the 7th of July, the tubular house was inhabitable on the 15th of September following.

In the second place, the mounting of this hollow framework—a sort of iron skeleton—was done without the help of any special workmen, by reason of the flexibility of the pieces. Finally, the house forms a whole, which is proof against tempests, winds and subsidence, and is believe that Mr Caron will thus be able to avoid the danger of fire; we should rather dread a danger from some ill-timed partial inundation in this original construction. But our engineer gives this no thought. He would be content in such an unfortunate event to turn the cock, and he thinks it better to get a little wetting than be burned out entirely. Such an opinion is defensible.

Whatever be the destiny (a long one, let us hope) of the tubular house of Chamonix, its designer will have had the rare merit, as an engineer and hygienist, of having conceived a new idea, of having thoroughly worked it out, and of having resolutely put it in execution.—*La Nature.*

Premature Occupation of New Houses: a Test for Relative Humidity of Habitable Apartments.

Regarding newly built houses, sanitarians, for the most part, teach us that a period of four months in summer and six in winter ought to be allowed between the end of the building operations and the entrance of the inhabitants into a house. In this way will be avoided the accidents that arise from the premature occupation of an apartment. It is scarcely necessary to add that, as soon as the house has begun to be occupied, to avoid dampness it should be heated and ventilated; treated, in a word, by all the usual means to maintain a healthy condition of the apartment. If the dampness persists in spite of all these precautions, the proprietor is responsible for the defects in his building. Physicians are sometimes requested to estimate the relative dampness of an apartment or room. This is not always easy by simple inspection, as a room may be damp although saltpetre does not grow on its walls or mould in its corners. The following is an exact means of appreciation, and one that is within every one's scope: In the room in question a kilogramme of fresh lime should be placed, after hermetically closing doors and windows. In twenty-four hours it should be weighed, and if the lime has absorbed more than ten grains of water (that is, more than one per cent.), the room should be considered damp and classed as unhealthy. The question of dampness of dwellings is a frequent cause of dispute between landlord and tenant, naturally solved in the affirmative by the latter and in the negative by the former. The question can be settled in the future by the test of the hydration of lime of which I have just spoken, and which will give irrefutable proof or refutation of the validity of such complaint. The dampness of dwellings is a cause of illness. The death rate is greater in quarters where the apartments are damp than where they are dry. Ventilation is defective where the walls are impregnated with water; the porosity of the walls is done away with, and can only be re-established after the evaporation of the water has been completed, and the heat required to effect this evaporation is furnished by the person living in the room. This is the cause of the vivid impression of cold which we experience in damp places, and it is a well known fact that exposure to the action of the cold renders the organism more accessible to the attack of morbid germs. The rotting of walls, which appears particularly in places where the water used in building contained nitrates and chlorides, is caused by changes from dryness to dampness and *vice versa*. It gives rise to fragmentation of the mortar, and even of the building stones themselves. Finally, frost can split a wall that is soaked in moisture. The dampness of dwellings is due to internal or external causes. There can be no doubt that a new building ought to be treated for a certain length of time by ventilation and heat, with a view to evaporating the really enormous amount of water incorporated with the building materials. According to Pettenkofer, a three-story house requiring 167,000 bricks would need some 835,000 litres of water to build. When this evaporation has been effected great care should be taken in insuring proper drainage for rain and other water.—*The Journal of the American Medical Association.*

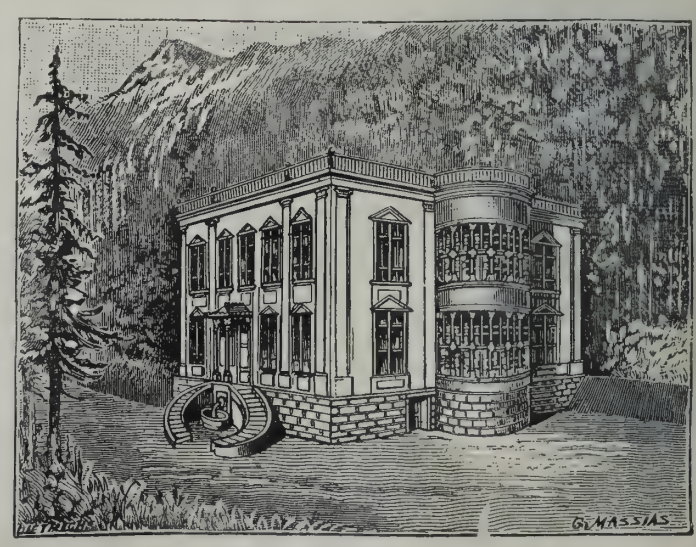


Fig. 2. TUBULAR HOUSE AT CHAMONIX.

Pavement of Swamp Hay.

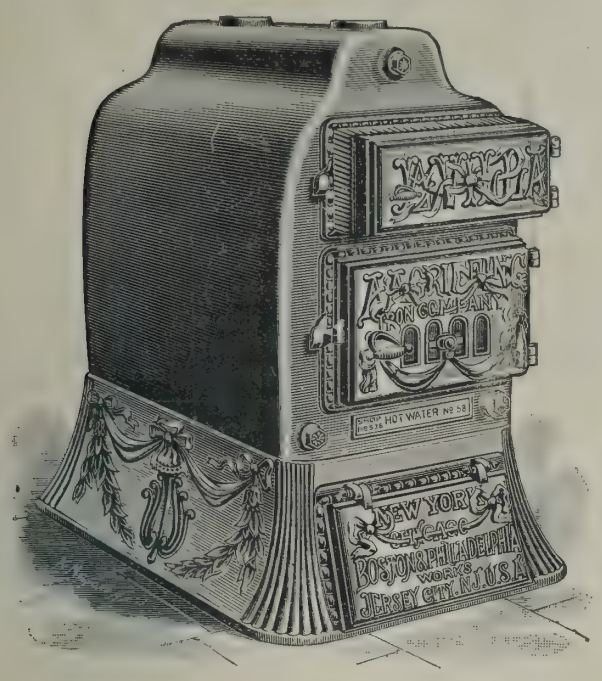
Permission has been granted by the Mayor of Baltimore to lay a sample of a new pavement, made of swamp hay, in order to test its durability. The material is swamp grass, which grows luxuriantly in the salt marshes along the Atlantic coast. It grows very compactly, and, in many places, to a height of six or eight feet. Laborers go into the marshes with large flat boats, and cut the hay, which falls into the boat as it is poled along through the water. The material is then put into bundles, and cut up into the proper length by a machine similar to the ordinary hay-cutter. It is afterward subjected to a moderate pressure, and made into blocks about six inches thick by sixteen long and twenty wide. These are then fastened by wires, very much in the manner that hay is put up. Before the blocks are shipped from the factory they are treated with a preparation of "dead oil," and they are then ready to lay upon the streets. The cost of putting down this pavement complete, including the preparation of the concrete foundation, is given at from $1.40 to $1.70 per square yard.—*Boston Transcript.*

Preventing Frozen Water-Pipes.

Sir James Crichton Browne has offered a suggestion for the cure of frozen water-pipes. Speaking at a congress of plumbers, he pointed out that water-pipes would never burst if protected by a vacuum. In the experiments at the Royal Institute upon liquid air and liquid oxygen, fluids were dealt with at a temperature of 180 degrees below freezing point. At such a temperature it would have been impossible to work with the fluids under ordinary conditions, but in tubes or beakers, with vacuum jackets, they were handled with the utmost facility, and poured from one to another without any difficulty, because the temperature could not pass through the vacuum. "Why," asked Sir James, "could not plumbers invent a vacuum pipe? A space even an eighth of an inch of a high vacuum would be sufficient. Inclose the pipe to be protected in an outer tube, exhaust the air from the intervening space, and hermetically seal the inclosing tube at the ends; then no changes of temperature could affect the protected pipe." Criticising this suggestion, a correspondent says the idea is not new, as he suggested it ten years ago. He has done more; he has tried to utilize it, but found that, as the inner pipe must be supported throughout its length, these points of contact form conductors. A simpler plan, he says, is to inclose the pipes in a bituminous cylinder, which, when slightly warmed, can be curved or bent, thus adapting both tubes simultaneously to any necessary curves, as well as of affording better facilities for jointing and connecting.—*St. Louis Globe-Democrat.*

LA VILLA HEATERS.

The A. A. Griffing Iron Company has brought out a double line of heaters called the La Villa, made with and without ornamental side plate and base plate. They are ornamental and portable, and may even be had with removable ash pan. There are ten sizes made for steam,



LA VILLA HEATER, No. 216.

and a like number for water, making twenty in all. These heaters have a very great amount of direct fire surface, since the entire fire pot is deeply corrugated.

In the La Villa heaters the fire has to travel three times the entire length of the heater before reaching the smoke pipe. It is very easily cleaned, for, when front and rear clean-out doors are opened, every square inch of the heater is visible and accessible for a thorough cleaning.

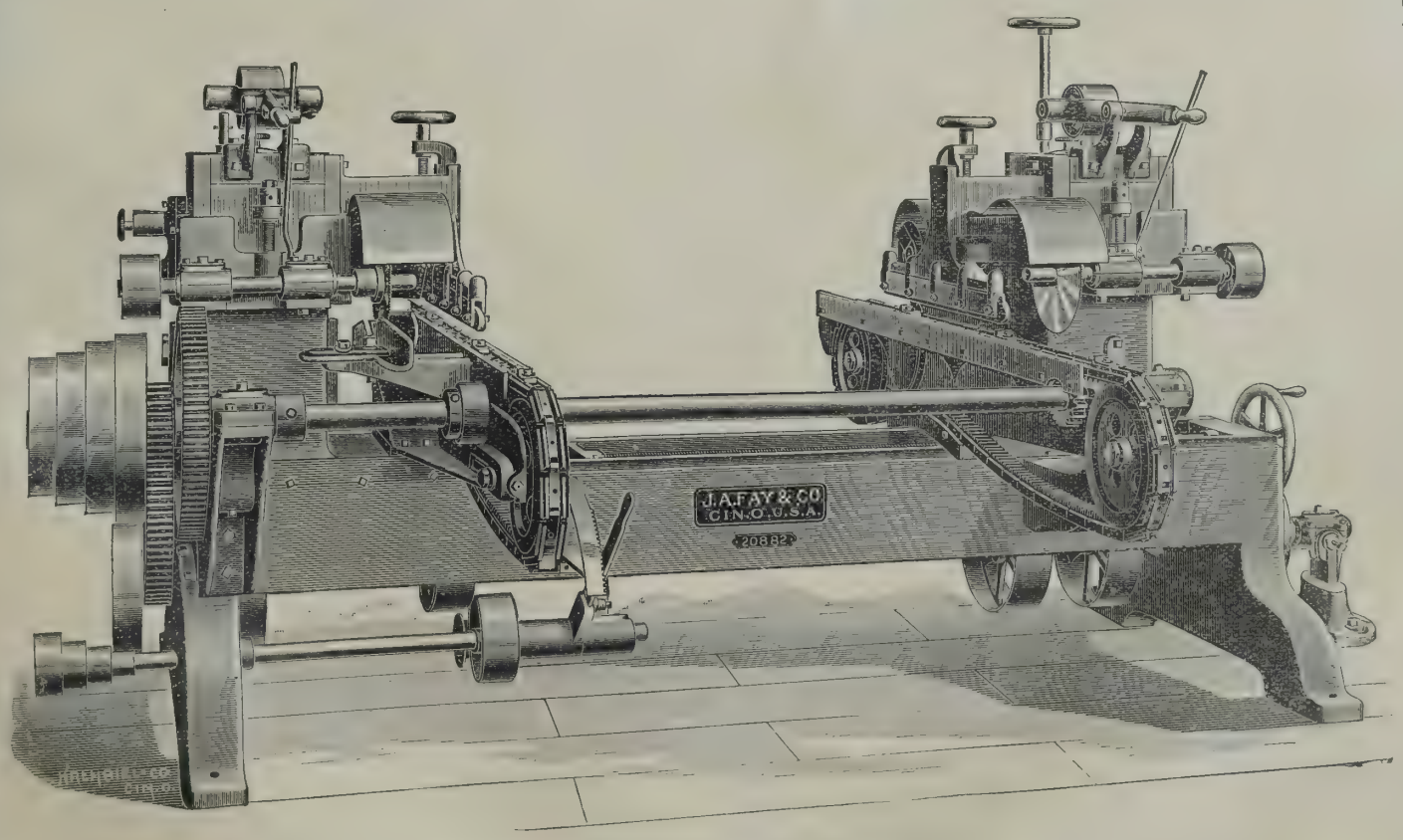
The La Villa heaters have a rocking and dumping grate; will burn successfully soft or hard coal, coke or wood; are easily set up; come practically in three parts, viz., base plate, ash pit section with grates already set in, and heater proper. They are not designed for heating large buildings, but for the thousands of small buildings such as cottages, small railway stations, etc., that are heated with steam or water, and work at a surprisingly low cost.

The makers have printed descriptive matter, which may be obtained by writing A. A. Griffing Iron Company, 66-68 Centre Street, New York; Boston, 177-179 Fort Hill Square; Philadelphia, 702 Arch Street, or the works, at Jersey City, N. J.

IMPROVED WOODWORKING MACHINERY.

To those engaged in the manufacture of cars, wagons, carriages, furniture, sash, doors, and blinds, house material, etc., a double-tenoning machine cannot fail to be an interesting appliance. The machine shown in the illustration has special features and contrivances, and will tenon perfectly narrow or wide, long or short, hard or soft material, and do it more rapidly than ever before. J. A. Fay & Co., of Cincinnati, Ohio, are the designers and constructors of this machine, which is but one of their many important and valuable introductions of the past twelve-month.

The machine is designed for cutting tenons on both ends of material, coping both ends of material, coping both ends at once in door and sash work, and cutting off to exact dimensions both ends of the material at one operation. The framing is very heavy, well braced, and with wide base. The housings are mounted on the bed, one of them adjustable for different lengths of material, and they support all the principal working parts; the mandrels that carry the tenoning heads are 1 7-16 inches in diameter, made of best steel, are lead ground, and run in long self-lubricating bearings. The mandrel slides have a vertical adjustment on the housings, and the upper mandrels have a lateral adjustment to permit it cutting a tenon longer on one side than the other, when required. The driving pulleys are located between the bearings, with adjustable bindings to keep the belt tight, with mandrels in any position. The mandrels that carry the saws are located on the opposite side of the housings in advance of the cutter heads, and have independent vertical and lateral adjustment. The coping attachment is located back of the tenoning heads, mounted on adjustable slides, and driven from independent countershafting, supported on the machine. The material is held in position by adjustable sectional pressure bars, holding each piece perfectly rigid while being tenoned. There are four changes of feed, varying from 15 to 45 feet per minute. For further particulars regarding this machine, apply to the makers, J. A. Fay & Co., 297 to 317 West Front Street, Cincinnati, Ohio.



No. 6 NEW PATENT DOUBLE-TENONING MACHINE.

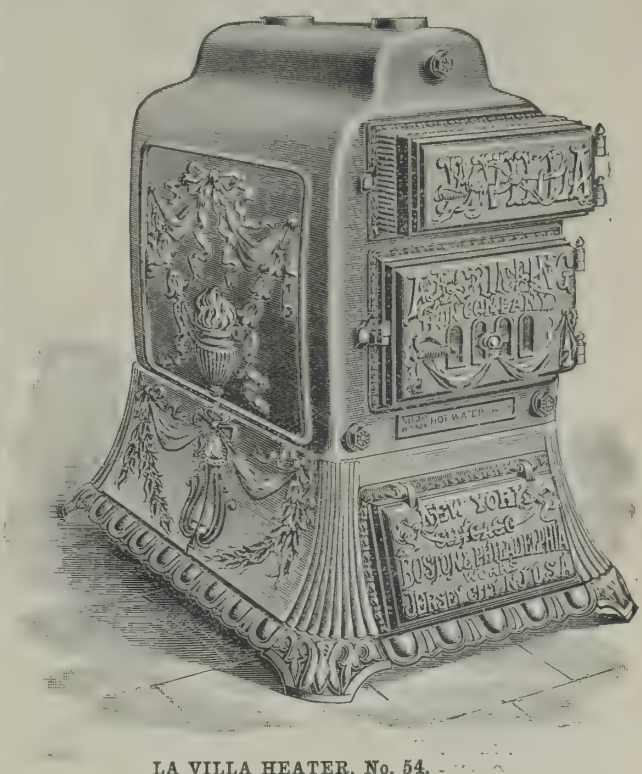
Inexpensive Cold Storage House.

A refrigerating house has been built in Michigan which will serve as a useful model for small country communities which desire the advantages of cold storage at a low cost. The walls of the house are built of cedar blocks, laid up with lime mortar like masonry, save that the mortar is laid under each of the leaders eighteen inches long, of which the wall is chiefly composed, leaving a six-inch air space in each joint. The outside of the wall has a coat of cement, and the inside is heavily coated with quicklime plaster, against which dressed sheathing was nailed while the mortar was still soft. The floor is paved with cedar blocks, and the loft over the storage room is filled with straw. The windows have five sashes, with successive four-inch air spaces. The cost of the building, with cold room 24 feet by 30 feet by 8 feet high, is given at about $600. The building is cooled by natural ice stored during the winter, and ripe fruits are kept in it a month without injury. —*American Architect.*

THE offices of the Colliery Engineer Company, proprietors of the *Colliery Engineer and Metal Miner*, *Home Study*, and the International Correspondence Schools, in the Coal Exchange Building, Scranton, Pa., were partially destroyed by fire on Sunday morning, August 30, 1896. The printing plant was in another building, and reserves of all instruction and question papers, drawing plates, and other supplies and stationery used in the schools were in still another building, so that the business was not seriously interfered with. New quarters were immediately secured, to be occupied until the completion of buildings now being erected on Wyoming Avenue by the company.

The Genesee Dam Project.

The Mount Morris storage dam project is about to take a new form. The survey undertaken by State Engineer Adams and George W. Rafter, of Rochester, N. Y., under the discovery of serious obstacles to that project, such as the appropriation of the last Legislature, has resulted in insecure foundations for the dam, and the vast superiority of a dam at Portage. While the former would give a fall to Rochester of 50 or 60 feet, the latter would give a fall of 330 feet, thus affording a water power of immense value to the industries of Rochester and intermediate points. The new plan would cost much more than the Mount Morris dam, as it involves the submergence of six villages and a large amount of valuable farming land; but it is pointed out that the opposition on



LA VILLA HEATER, No. 54.

this account would probably be overcome to a large degree by the advocates of the construction of similar State dams on the Hudson, Black, Chemung, and Mohawk rivers.

THE Pancoast ventilator and chimney cowl, made by the Pancoast Ventilator Company, of Philadelphia, not only guards off down currents and rain, but invariably augments the up draught in whatever direction the wind may be from. In many cases high chimneys will not be required when this ventilator is used. It is storm-proof and cinderproof, and is handsome and durable. These ventilators are made of the best black metal, galvanized, leaving no raw or unprotected edges to rust.

THE Yale lock manufacturers have proved that in a patent lock having six "steps," each capable of being reduced in height twenty times, the number of changes or combinations will be 86,400. Further, that as the drill pin and the pipes of the keys may be made of three different sizes, the total number of changes will be 2,592,600. In keys of the smallest size the total number of changes through which they can be run is 648,000, while in those of the large size the number can be increased to not less than 7,776,000 different changes.

TOOLS for nearly all branches of manufacture are well represented in the new and comprehensive catalogue of Messrs. Hammacher, Schlemmer & Co., 209 Bowery, New York. The book has more than 400 large, closely printed pages, and is profusely illustrated. It is specially noticeable in the large line of tools described and used by the building trades. Different sizes and many different makes and qualities of almost every tool required are here described, and prices given, including particularly tools for cabinet-makers, pattern makers, upholsterers, carpenters, wood carvers, sculptors, masons, plasterers, plumbers, gas fitters, painters, moulders, modelers, machinists, jewelers, etc.

AN inscription has been put on the Matterhorn reading: "Notice.—This road is dangerous for bicycles."

The Surroundings of Statues and Monuments.

We have often said that in this country the placing of outdoor statues and monuments is not properly considered. Such works cannot have their most effective exposure, nor can they increase the attractiveness of their surroundings, unless they are artistically adapted to the special character and the special arrangement of neighboring objects. The effect of its environment upon the work of art, and the effect of the work upon its environment, should be considered with equal care. And this care can be rightly bestowed only if the site is selected before the monument is designed. At the very least, the general character of the probable site should be thoroughly well understood in advance.

The folly of disregarding these plain truths has recently been shown by the attempt to secure a monumental statue of General Sherman for the city of Washington. Exceptionally fine sites for monuments of all kinds exist in that city; and from all accounts the models recently put on exhibition are interesting and varied in character. Yet the first thought excited in the minds of all who have examined these models seems to have been the difficulty of deciding between them, for the reason that no one had any idea where the accepted design would eventually be placed.

One of the newspapers of the city remarked that with this thought, as it inevitably arose, came "a feeling of injustice, not to the artists personally, for they all share alike in the disadvantage, but to their art itself, in asking for competitive designs without any indication of the kind of location the proposed monument is to occupy. It will readily be seen how a design of superior excellence in itself may fail of success because not so well suited to certain finally chosen surroundings as another of less merit; also, that every artist was placed in a trying dilemma, whether to try to adapt his work in a blind sort of way to all possible surroundings, at the sacrifice of artistic completeness and strength, or to design with a view to an imagined combined effect of statue and environment, at the risk of being thrown out for want of these conditions."

Some of the competitive designs were elaborate constructions, with terraces, balustrades or parapet-walls. Others showed the chief equestrian figure upon a highly wrought pedestal, adorned by subordinate figures or groups; and others presented this figure in isolation upon a simple pedestal. The mere fact that, among the designs of the last-named class, the pedestals varied conspicuously in height, complicated judgment upon the intrinsic merits of the works by bringing in the question of appropriate placing. And, of course, the more elaborate the compositions were, and the more dominant their architectural elements, the greater became the importance of the matter of placing and environment.

Four of these varied compositions were eventually selected from the many. But just here an evil only too common in American practice once more has obtruded itself; that is, the decision of the distinguished sculptors who had been selected as experts to pronounce upon the merits of the models was not fully accepted by the representatives of the Army of the Tennessee, the donors of the statue. Only one of the four models which has received the honor of published preference, and the author of which has been admitted to the final competitions, was among the four which the expert jury pronounced the best. After such a bad beginning, the Committee of the Army of the Tennessee has now to decide upon the site it prefers, and to obtain official permission to use it. It is stated that this choice will be made before the four prize-takers begin to elaborate their ideas for the final competition. But it is already too late to utilize the fine artistic opportunity to the full. The committee must be confused in its selection of a site by the varying character of the four models for which it has shown its preference; and when the site is chosen, more than one of the competitors will be forced to alter his idea conspicuously, or, perhaps, to recast it into a composition of an entirely different kind. This fact is made plain when we say that one of the chosen designs shows a very tall pedestal, surmounted by an equestrian statue, adorned with large reliefs, and surrounded by allegorical figures, all raised upon an elaborate architectural base; while another shows a much lower pedestal, with an exedra behind it: that is to say, one of these two monuments should be equally conspicuous from all points of view, while the other should be so set that the front view would be much more important than any other.

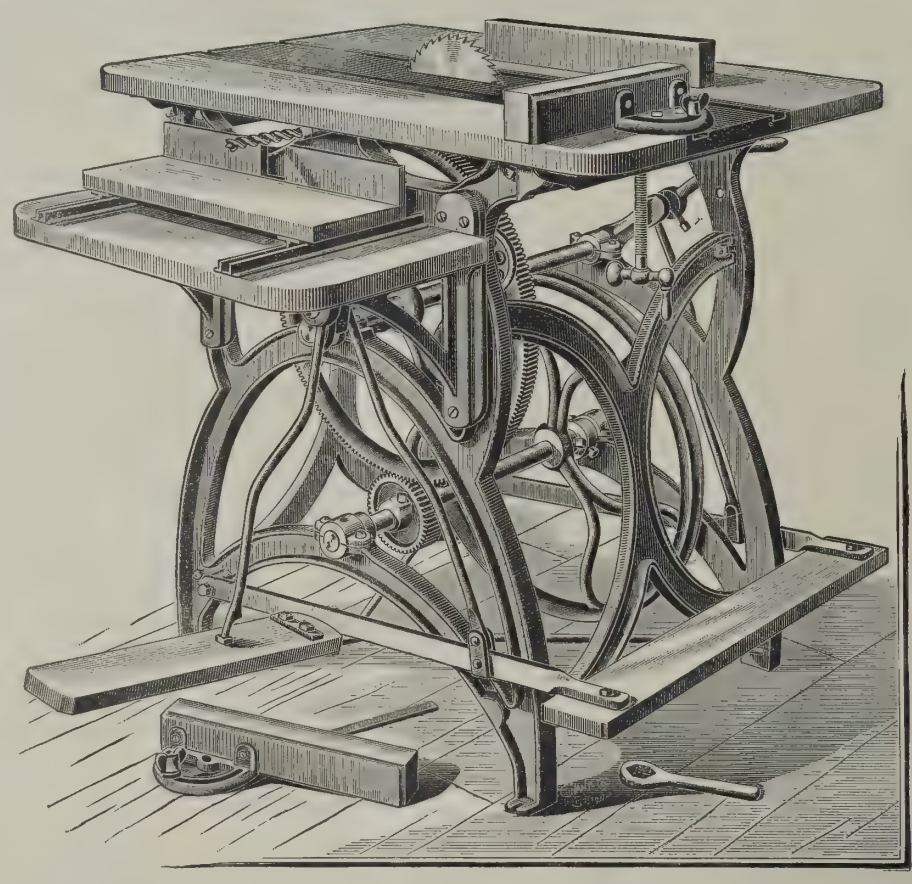
The proper method of procedure in a case like this would have been to choose a site at the very outset, after consulting with the experts who were to judge the models in regard to the general character which would be desirable for the monument itself. Thus, an intelligent choice among varying sites could have been made, and, on the other hand, the artist would have had a definite, or, at least, general idea to work upon. Or, still better, in a city where monumental sites are so fine and so diverse as they are in Washington, two or three sites of different sorts might have been chosen, with the understanding that it was open to each competitor to decide for which one he would prepare his design, and that his design would then be judged upon its intrinsic merits, as adapted to that special situation and no other. Thus the danger of possible loss through the checking of some fine idea by too narrow a limitation of opportunity would have been avoided, and yet the sculptors would not have been obliged to adapt their work "in a blind sort of way to all possible surroundings, at the sacrifice of artistic completeness and strength," or else "to design with a view to an imagined combined effect of statue and environment," which it might prove impossible to realize in fact.

When it comes to a decision between the merits of works offered in competition, as little as possible should lie in the scale besides the intrinsic excellence of the respective models. And this state of things can be brought about only if the competitors have in advance a clear idea with regard to the special site, or, at least, the special kind of site, for which their work is desired.—*Garden and Forest.*

AN IMPROVED CIRCULAR SAW.

The frame of this saw is entirely of iron, and of a design which gives it great strength. The thorough manner of bolting makes it very rigid, and its weight renders it unnecessary to fasten it to the floor. The working parts consist of two shafts and the saw arbor. The centre shaft receives the power from the operator either by treadle or crank, and is applied direct by means of a 20-inch cut gear on that shaft which meshes into a 2-inch gun metal gear on the saw arbor, and also with a 4¾ inch gear on the lower shaft, which also carries a lathe-turned balance wheel, 23 inches in diameter, and weighing 40 pounds. By this means the balance wheel is given a speed four and one-half times greater than the crank or driving shaft, giving it sufficient momentum and power to carry the saw steadily through the work. At the same time the 20-inch gear meshing into the 2-inch gear on the saw arbor gives the saw a speed ten times greater than the driving shaft. All shafts are made of Bessemer steel, accurately lathe-turned, and are not cold rolled. The table is 28 inches wide by 37 inches long, and the entire height of the machine is 36 inches. The improved iron top, now used on all of these circular saw machines, consists of a centrepiece 10 inches wide, running the whole length of the table, and is bolted solidly to planed cleats on under side; and as it contains the grooves that the cutting-off gauges slide in, and is the part subjected to the greatest wear, it must of necessity be and remain perfectly accurate and true at all times to make the machine of any value as a help in the workshop and of profit to the purchaser.

The improved iron top is not affected by moisture, and will not warp or twist, the great fault common to all tops made entirely of wood. The grooves for the two cutting-off gauges mentioned above, which are planed in this iron top, are on each side of the saw, and are perfectly parallel, and adjusted in line with the saw. The utmost pains is taken with these tops, that they may be perfectly straight, square, and that the grooves are in line with the saws.



HAND AND FOOT POWER CIRCULAR SAW.

The gauge tongues are of steel, accurately fitted. The ripping-gauge slides in a planed iron groove on the right of the saw. The balance of the table, on each side of the iron top, is made of hardwood, trued off level with the same. The table is hinged at the back, and can be raised by means of a hand wheel for grooving, rabbeting, etc.

Machines are made in two numbers, the only difference being in the weight of the balance wheels: No. 1 has a 40-pound balance wheel; No. 2 has a 70-pound balance wheel. The same boring attachment goes on to either machine. The cut represents the machine with boring attachment and side treadle in place.

Machines are put up with two 7-inch saws, one cross-cut, and one rip, set and filed, ready for use; two cutting-off gauges, one ripping-gauge, two crank-handles, and wrench. They are sent out all ready to run when taken out of the crate.

This circular saw is made by J. M. Marston & Co., 199 Ruggles Street, Boston, Mass., who will be pleased to send a fully illustrated catalogue of their patent hand, foot, and steam power machinery to any address on application.

SCOTT'S EXTRA COATED ROOFING TIN.

In these days of manufacturing in heavy tonnage and consequent cheapening of cost, the fact should not be lost sight of that some articles have not been made well and of enduring quality through rapid methods, and at the lowest rates. Wearing quality of the material to be used for roofing a house is about as important an item for serious consideration as is any article of workmanship connected with its construction. The American manufacture of tin plate, although of a comparatively recent date, is said now to average higher as to quality than the foreign makes. Tin plate is used for many different purposes, and for some, such as the making of common cans, a cheap tin may be amply good. On the other hand, when a valuable dwelling, even if modest in cost, or a store building, warehouse, or public edifice, is being erected, the best of roofing should be required. This can be found in a roofing tin that is made of the articles and by the processes which insure durability. The body of the sheet should be made of soft iron or steel, laid flat, and accurately squared and resquared. Each sheet should be separately treated in the tinning house, and put through the method of treatment by palm oil strictly from first to last, no acid flux being used in any one of the dippings. Each sheet should also be separately dipped and redipped by hand in several pots of melted tin and lead, only through palm oil. Many of these requisites are slighted, and some entirely omitted in other so-called, high-class roofing tins. Ways of making are had whereby a heavy coating of metal may be placed upon the sheet, yet the thorough and strictly palm oil method, and the repeated dippings by hand, are curtailed. Some of these plates may have a coating in which the proportion of the costlier metal, *i. e.*, tin, is quite large. Others bearing a dull, dark, grayish blue color, prove a coating mostly of lead. A roofing tin made primarily by the acid flux process, and then dipped by hand afterwards, is not a legitimate old style plate.

"Scott's Extra Coated" guaranteed roofing tin has been upon the market for many years. Originally made in Wales to definite specifications, it has been manufactured for over four years in Pittsburg, its makers having completed a new and enlarged factory this year. This brand has always been guaranteed. It is made from selected material throughout, by the best method to insure durability, strictly and entirely palm oil process, each sheet passing through five dippings and redippings by hand, the black plate, first squared and resquared, being given a metal coating of forty-six pounds per box, particularly rich in pure block tin. After a rigid inspection of each sheet, those found perfect are stamped with the registered trade-mark, and the manufacturers hold themselves responsible for any defects in material or error in manufacture. When the "Scott's Extra Coated" is applied to the roof, and the roof kept properly painted, the makers warrant its wearing qualities against all the ordinary weather conditions. This tin was formerly imported or made by James B. Scott & Co. It is now manufactured in Pittsburg, Pa., by the Follansbee Brothers Co., of which company the officers are the surviving partners of the old firm.

SCIENTIFIC AMERICAN.

Building Edition.

A COTTAGE AT CHESTNUT HILL, MASS.

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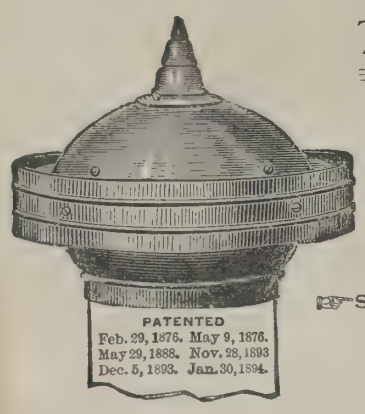

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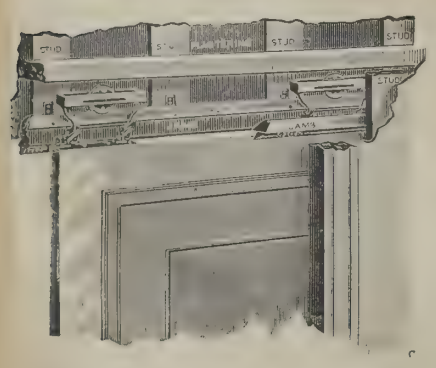

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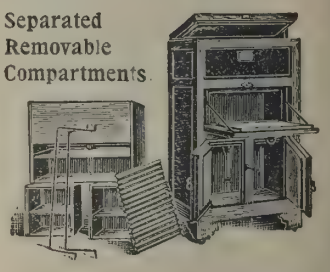

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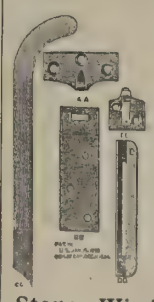

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☞ See Alphabetical Index to Advertisers in present Number on page xii.

SCIENTIFIC AMERICAN

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GOTHIC PULPIT OF CARVED OAK.—See page 74.

Scientific American.

ESTABLISHED 1845.

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No. 361 BROADWAY, NEW YORK.

NEW YORK, NOVEMBER, 1896.

THE

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BUILDING EDITION.

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SCIENTIFIC AMERICAN, BUILDING EDITION.

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SANITARY ENGINEERING.

The existence of a separate body of professional men devoted to sanitation is one of the evidences of the improved conditions under which we live. There was a time, not so distant but it is well within the memory of many people living to-day, when the profession of sanitary engineering as such did not exist. The architect who designed the homes, and the engineer who looked after the cities, were supposed to provide for the comfort and convenience of the householders; but the idea of a separate profession, whose duty it should be to advise upon those features of a house or a city which concern the health and cleanliness of the people is modern, and has only taken practical shape in recent years. The growth of this branch of engineering is not due to any deliberate effort to create a separate profession; but rather to the growth of intelligent knowledge of the laws of sanitation, and the demand of the public that these laws shall be followed in the construction of their homes, and in matters affecting their municipal well-being. The public enlightenment has come as the result of the teachings of science and bitter experience. While medical men have been urging the need for pure water supply, good drainage, and abundant ventilation, the scourge of epidemic has descended from time to time with a terrible persistency to indorse their teaching. The Board of Health, with its statistics of sickness and mortality, has proved to a demonstration that there is an intimate relation between a city's drainage and its death rate, and that hygiene and health go hand in hand.

The birth of the present movement in favor of improved sanitation took place within the present half century, and, indeed, its best work has been done in the past twenty-five years. This is clearly evident if we compare the average dwelling of the earlier period with the average house of to-day, especially if the comparison be made in the homes erected for the middle or working classes. Household conveniences, which were then to be found only in the homes of the rich, are now at the command of the laboring man, and it will soon be a rare occurrence for a cottage to be built which does not contain a bathroom, open plumbing, and a heater in the basement.

Of all the sanitary improvements affecting the public health in cities, there is none to equal that which has been made in the matter of water supply; for, while it is true that open plumbing, improved closets, and the domestic bath are vital to public health, it must be remembered that their existence is only possible where there is an abundant supply of water. It is in the volume as well as in the quality of water supply that we have advanced; and the one was as necessary as the other.

The higher death rate of former years was largely due both to the scarcity and the impurity of the public water supply. It frequently happened that the water was pumped from an adjacent river, that was carrying the drainage of towns and villages which lay nearer its source. The water was distributed to the city mains without sufficient filtration, and to the chemical impurities was added a larger or smaller amount of organic matter, which was an easy breeder of typhoid and kindred diseases. River supply was supplemented by so-called wells, which were often mere cisterns for the catching of surface rainfall, and such filth as might enter by seepage from adjacent sewers or the neighboring stable or burial ground. To-day the water supply of a great city is gathered high up among the hills, at the uncontaminated headwaters of the rivers. The supply is frequently impounded at a point from fifty to one hundred miles from the city. New York City draws its supply from the Croton river, forty miles distant: Liverpool has its Vyrnwy reservoir situated seventy miles distant among the Welsh hills, and to the south of Vyrnwy it is now proposed to create enormous reservoirs for the supply of London, and build some two hundred miles of aqueduct to carry the water.

Closely related to the water supply is the matter of house and city drainage. Open plumbing and self-flushing closets have been the death blow to many diseases which formerly lurked in inaccessible drains, and the pernicious boxed up closets of the last generation. It used to be that the periodical return of sickness to a home would be ultimately traced (as well it might be) to "defective drainage;" and the general tearing up and reconstruction which followed was but a half cure for defects which called for an abundant flushing with water, which the city's limited supply was unable to give. And the reform which has purified the house has extended to the city. The cesspool is growing mercifully scarce (at least in America and England), and the public are fast awakening to the fact that the discharge of sewage into a river is fraught with danger to every city or hamlet that is built upon its banks. The triumphs of sanitary engineering are nowhere more manifest than in those elaborate plants which have been established for the purification of sewage and the recovery of its organic matter as a valuable commercial product.

Side by side with the improvement of drainage and water supply, has come a better knowledge of the laws of ventilation and improved methods for securing it. The low ceilings and cramped passages of the last generation have given place to lofty rooms and commodious halls. Time was when in designing a house the provision of sleeping accommodation was almost an afterthought. The junior members of a household were crowded into small, stuffy rooms, and the domestics found a couch where they could—generally in small attics tucked away in the angles of the roof. But improved sanitation may justly claim to have changed all that, and in addition to removing the noxious gases which arose from defective drains, it has taught the need for large, airy, and wholesome sleeping rooms. We find to-day that the bedrooms are among the finest in the house, lofty, well lighted, and with means for regulating the temperature in the winter months.

In thus reviewing the progress of sanitary engineering, it must be borne in mind that its benefit is not merely a negative one. It has diminished the amount of disease, and it has cut down the death rate; but, over and above this, and perhaps greatest blessing of all, in purifying and sweetening the surroundings of their daily life, it has brought a permanently bettered condition of morals and character to mankind at large.

A COTTAGE AT CHESTNUT HILL, MASS.

Our colored plate on cover and engraving on page 77 illustrate a cottage recently erected at Circuit Road, Chestnut Hill, Mass. The engraving presents a design of unusual beauty, of the gambrel roof order, with Colonial detail and latticed window effects. The underpinning and balustrade at piazza are built of field stone laid up at random. The superstructure is covered with sheathing, paper, and shingles, and the latter are left to weather finish a silver gray color, while the trimmings are painted white. The roof is shingled and finished natural. Dimensions: Front, 28 ft.; side, 44 ft. Height of ceilings: Cellar, 7 ft.; first story, 8 ft. 6 in.; second story, 8 ft.; third story, 8 ft. The entrance is through a lobby. The main hall is the most artistic and attractive apartment. The staircase hall is separated from reception hall by columns extending to ceiling and forming an arcaded effect; the latter is provided with nooks at either end, containing paneled seats. The staircase is an ornamental one, with spindle newels, balusters and rail, and is lighted effectively by a bay window thrown out at first landing. This hall and parlor are treated with china white, dead finish, and in a dainty manner. The latter is circular in form and contains a cluster of windows at front. The dining-room is trimmed with oak. It has a paneled wainscoting, and contains an open fireplace, furnished with tiled hearth and facings, and a mantel of good design, with columns and mirror. At side of fireplace is a china closet built in, with leaded glass doors. Butler's closet is fitted up with closets, drawers, and shelves complete. Kitchen is trimmed and wainscoted with North Carolina pine, and is fitted up with a large pantry and all the best modern fixtures. The second floor is treated in white, and it contains four bedrooms, large closets and bathroom; the latter is wainscoted and provided with porcelain fixtures and exposed plumbing. Third floor is provided with two bedrooms and trunk room. Cemented cellar contains furnace, laundry, and other necessary apartments. Cost $5,500 complete. Mr. J. H. Morse, architect, 8 Exchange Place, Boston, Mass.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

GOTHIC PULPIT OF CARVED OAK.

Her Excellency, Sra. Da Antonia de las Rivas, a wealthy lady of Bilboa, continues to enrich her magnificent palace at Portugalete with real treasures of modern Spanish art, collecting anything that may be suggested by her exquisite artistic taste, praised by all who know the fine works of art that she has brought together. The sumptuous chapel connected with this palace—for which the beautiful pulpit illustrated in this issue on page 73 was ordered—is a good proof of this excellent taste.

It is a masterpiece of the purest florid Gothic style, done in Swedish oak, with mouldings and background of dull and polished Spanish gold. It was made in the studio of José Suárez, a noted artist of Madrid, capable of competing with the most famous artists of other countries, who has again demonstrated his fine talent in this magnificent piece of work, with its elegant proportions, correctness of lines and fine carving.

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A RESIDENCE AT NEW HAVEN, CONN.

Our engravings on page 76 present a residence recently erected for Henry Herz, Esq., at New Haven, Conn. The design is of unusual beauty in its execution, and it has many excellent features which break the lines in a most artistic manner. The underpinning is built of ashlar brownstone from local quarries. The building above is of wood, with the exterior framework covered with sheathing, paper, and clapboards, and is painted a silver gray color, with white trimmings. The roof is covered with shingles and finished natural. Dimensions: Front, 34 ft. 6 in.; side, 42 ft., not including piazza. Height of ceilings: Cellar, 7 ft.; first story, 9 ft. 6 in.; second, 9 ft.; third, 8 ft. Vestibule is trimmed with quartered oak and paneled. The reception hall is also trimmed with quartered oak, and is furnished with a paneled wainscoting, a pleasing nook with seat, and an ornamental staircase, with seat, and newel post and balusters neatly turned, and also a toilet conveniently located under staircase. This staircase is lighted by a cluster of windows, two of which are glazed with stained glass with good effect. The floors throughout first and second stories are laid with oak and polished. The parlor and dining-room are trimmed with oak; both are connected by sliding doors, and the former is provided with a false chimney breast and mantel of excellent design. Kitchen and pantries are trimmed and wainscoted with North Carolina pine, and are fitted up with the best modern conveniences. The second floor is trimmed with brown ash, and it contains a large sitting-room running across the entire front, with two bay windows thrown out, two bedrooms with closets, and bathroom. The bathroom is paved and wainscoted with oak, and it contains porcelain fixtures and exposed plumbing, all nickelplated. The third floor contains two bedrooms. Cemented cellar contains furnace, laundry, and all necessary apartments. Cost $6,000, including furnace, and everything complete, ready for occupancy. Messrs. Brown & Von Beren, architects, 70 Church Street, New Haven, Conn.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

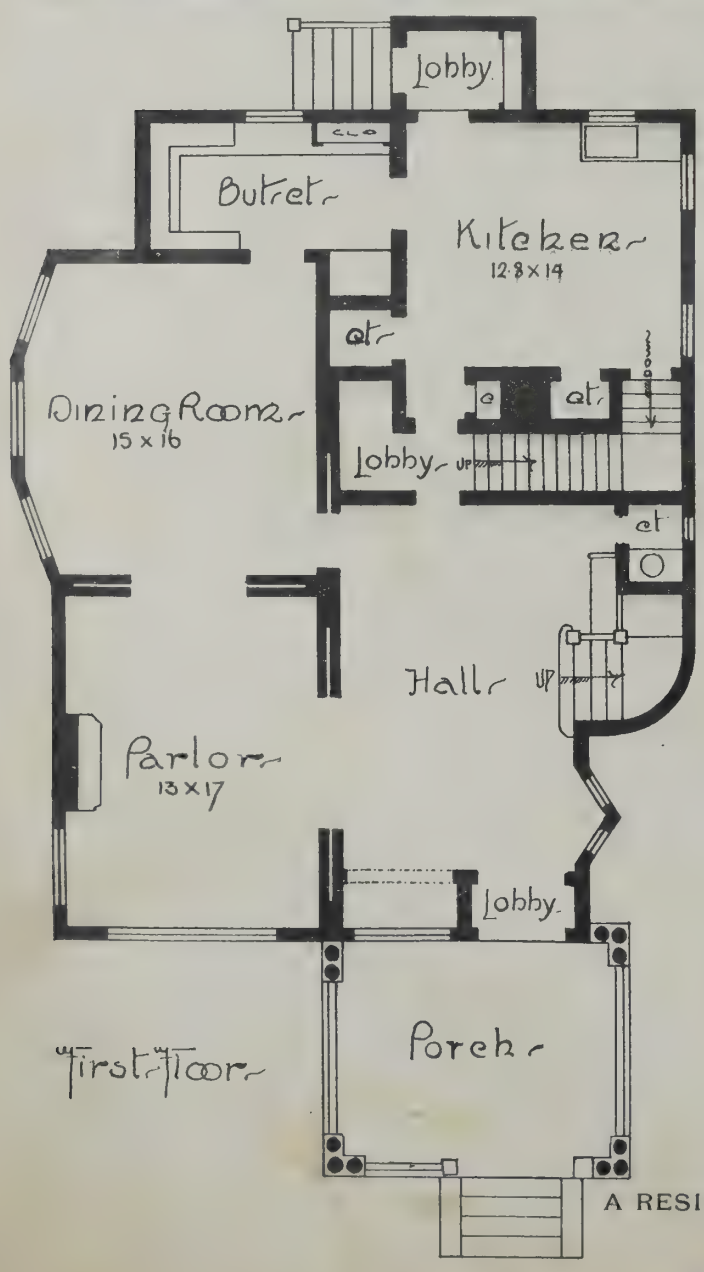
INTERIOR VIEW OF HALL IN MR. HERZ'S HOUSE, AT NEW HAVEN, CONN.

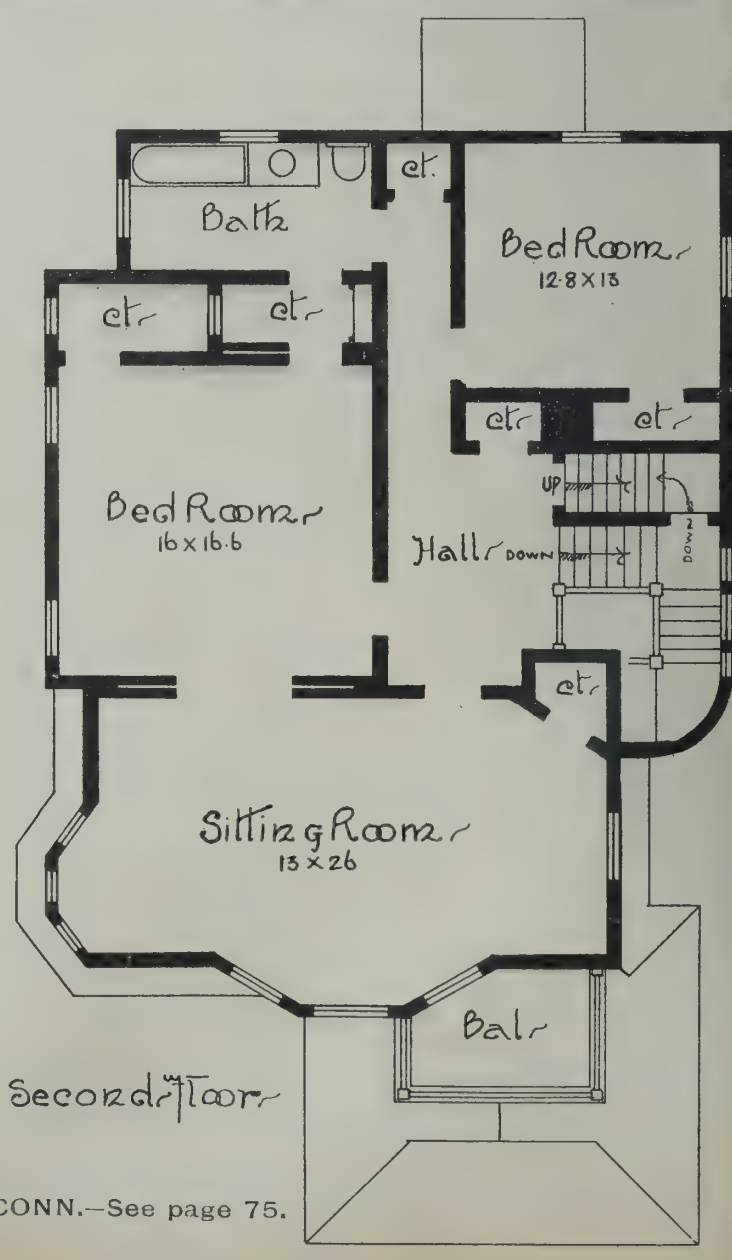
A RESIDENCE AT SCRANTON, PA.

We present on page 80 illustrations showing the residence of Thomas H. Dale, Esq., at Scranton, Pa. The design is executed in a clever manner, and it has many good features, including a spacious piazza, bay windows, balcony, and chimney, which is a feature in itself. The underpinning is built of rock-faced stone of a natural blue color. The chimney is built of buff brick. The exterior framework is sheathed, and then covered with paper; the latter is covered with clapboards and shingles, and painted light olive green, with bottle green trimmings. The roof is shingled, and painted red. Dimensions: Front, 46 ft.; side, 59 ft., not including piazza. Height of ceilings: Cellar, 7 ft.; first story, 10 ft.; second, 9 ft.; third, 8 ft. The vestibule is located at side, but facing front, allowing entrance to hall, and providing ample room for two apartments facing front. This main hall and vestibule are trimmed with quartered sycamore, and are provided with floors laid with sycamore, birch and white maple, and also paneled wainscotings. The staircase is a grand open one, provided with columns extending to ceiling, and fitted up with a grille screen, and lighted effectively by stained glass windows. The fireplace is built of brick, and furnished with tiled hearth and facings, and mantel. The parlor and sitting-room are treated with white and gold, and are well lighted, and fitted up with open fireplaces, with tiled trimmings, and mantels of dainty design, and treated similar to finish. Library and dining-room are trimmed with mahogany. The latter is provided with a paneled wainscoting, and a china closet built in. Kitchen is fitted up with pantries and all the necessary fixtures, and is wainscoted with narrow beaded stuff. The second floor is trimmed with oak. It is provided with four large bedrooms, ample closets, and bathroom. The latter is conveniently located, and it has a tiled wainscoting, paved floor, porcelain fixtures, and exposed plumbing. Third floor is trimmed with natural poplar, and it contains four bedrooms and ample storage. Cemented cellar contains furnace, laundry, and all necessary apartments. Cost $9,890 complete. Messrs. Brown & Morris, architects, Scranton, Pa.

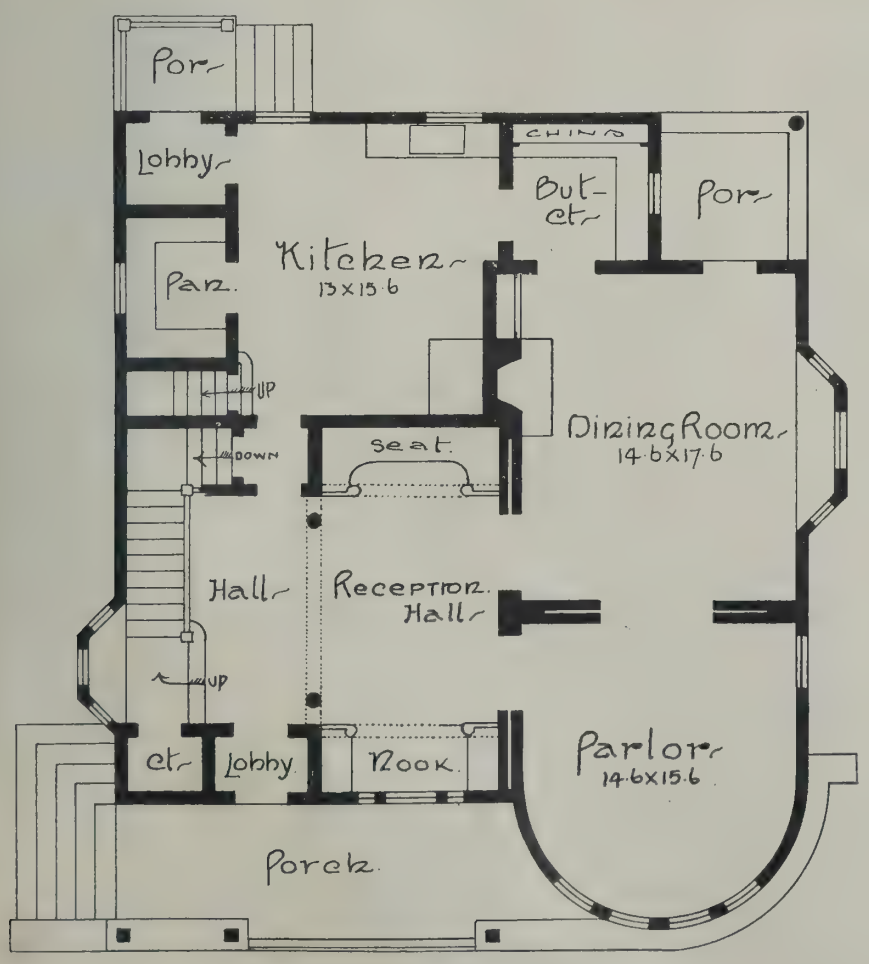
Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

THE name of "Ceramic Stone" has been given by M. Garchey, a French inventor, to a new building stone obtained by him from broken glass. The glass—broken bottles, window panes, etc.—is reduced to powder, different kinds are mixed if variegated color is desired, and the pulverized material is devitrified by passing successively through two furnaces, the second being one of high temperature. The pasty mass is then passed under a press, which gives it shape and consistence.—*Ex.*

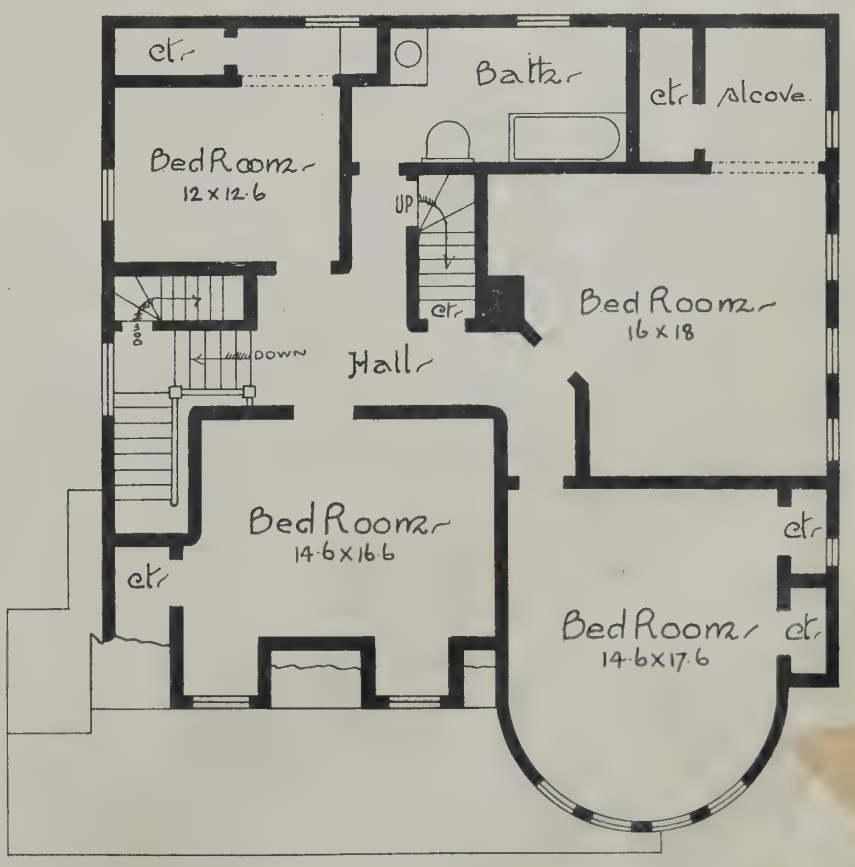




A RESIDENCE AT NEW HAVEN, CONN.—See page 75.



First Floor.



Second Floor.

A COTTAGE AT CHESTNUT HILL, MASS.—See page 74.

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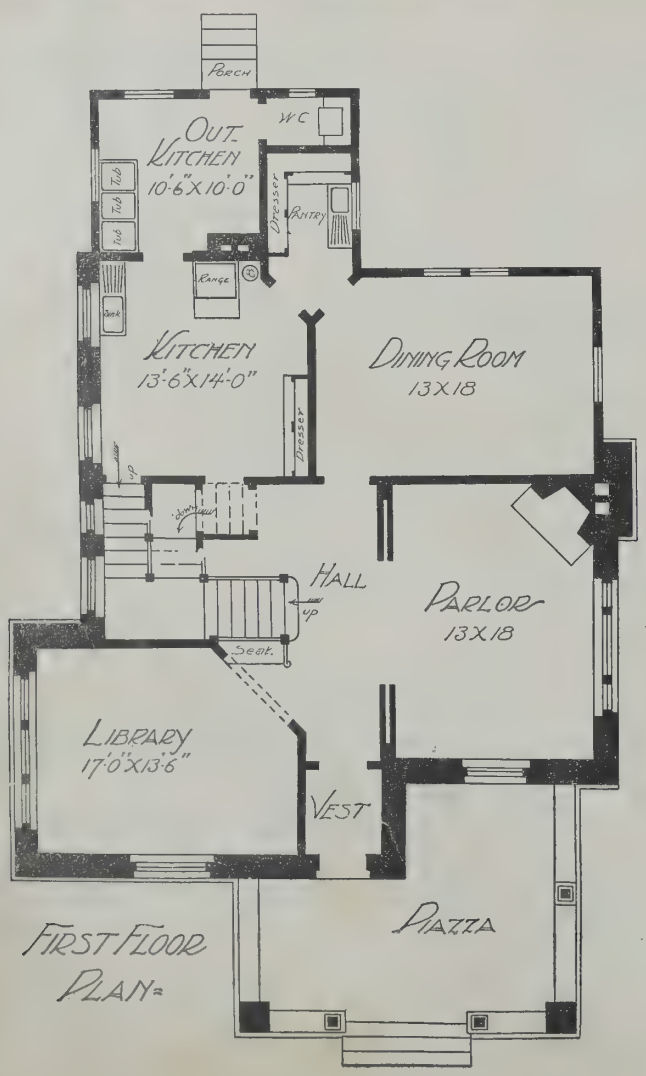

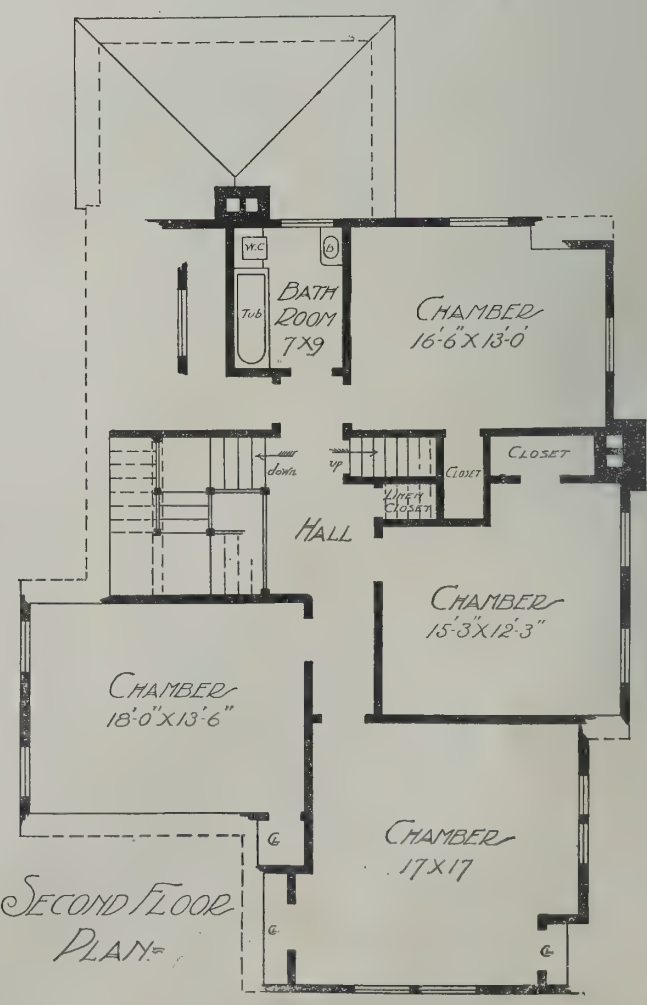

A COLONIAL COTTAGE AT ROLAND PARK, BALTIMORE, MD.—See page 88.

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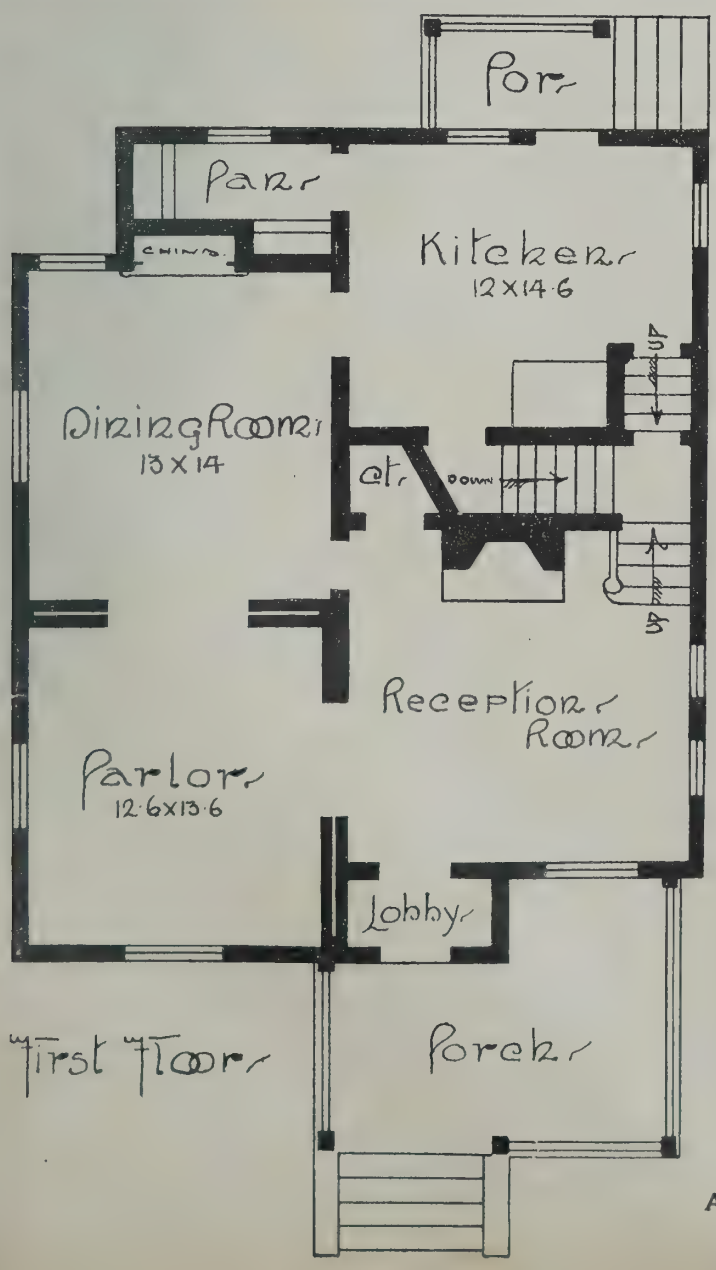

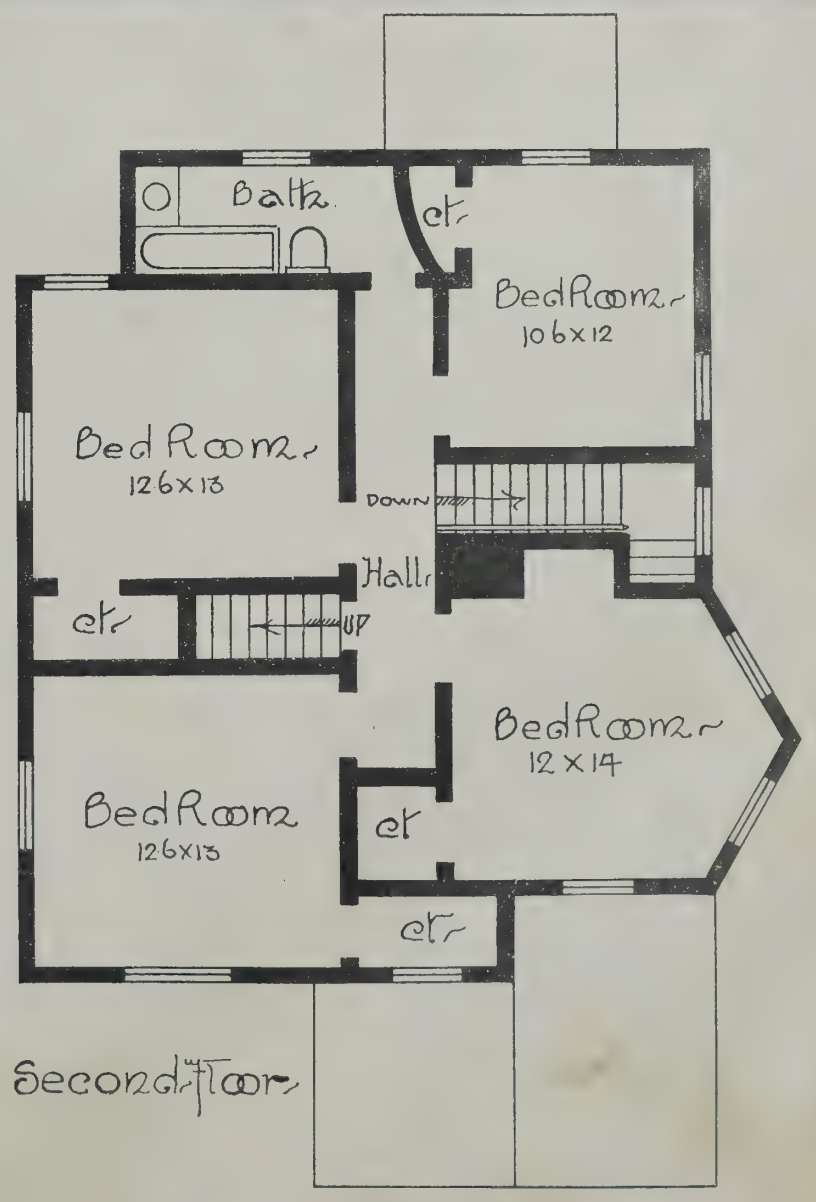

A COTTAGE OF LOW COST AT BINGHAMTON, N. Y.—See page 88.

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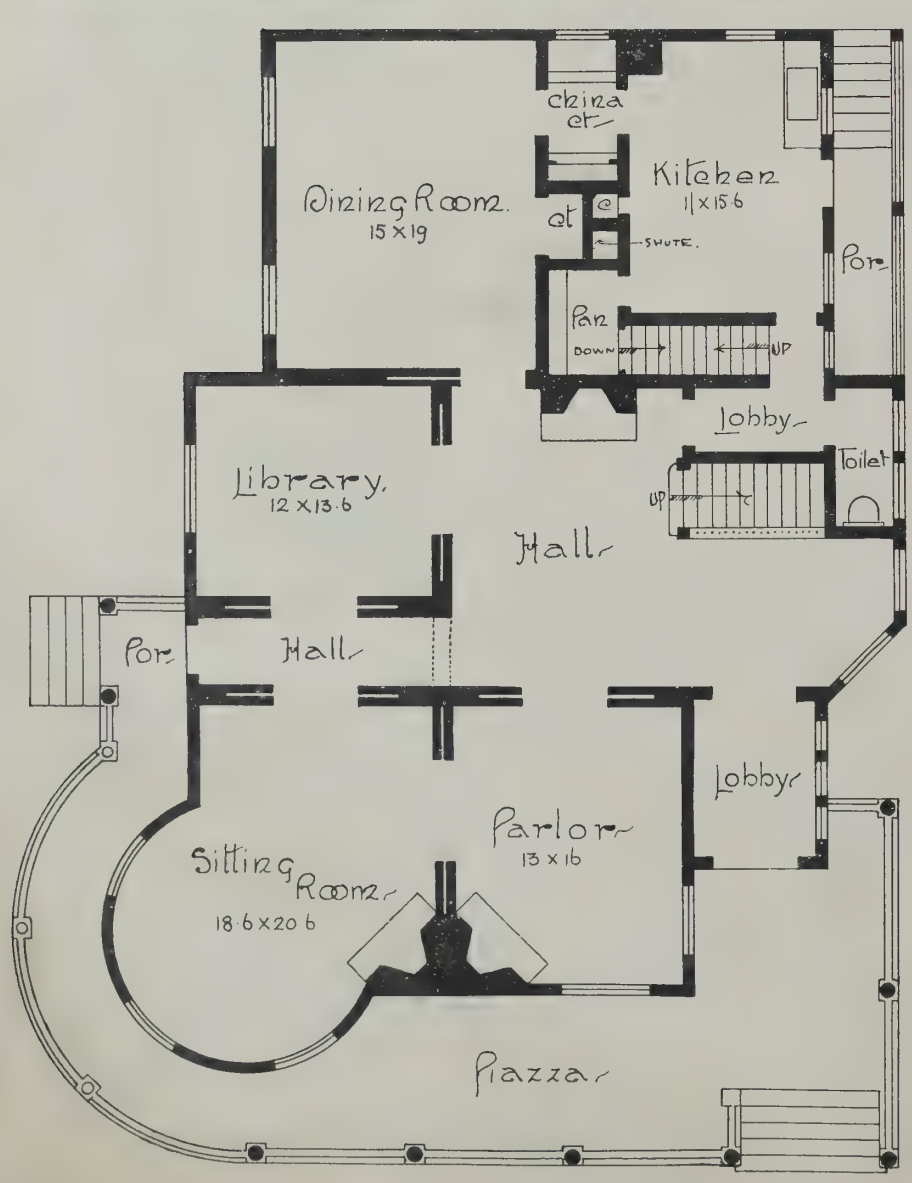
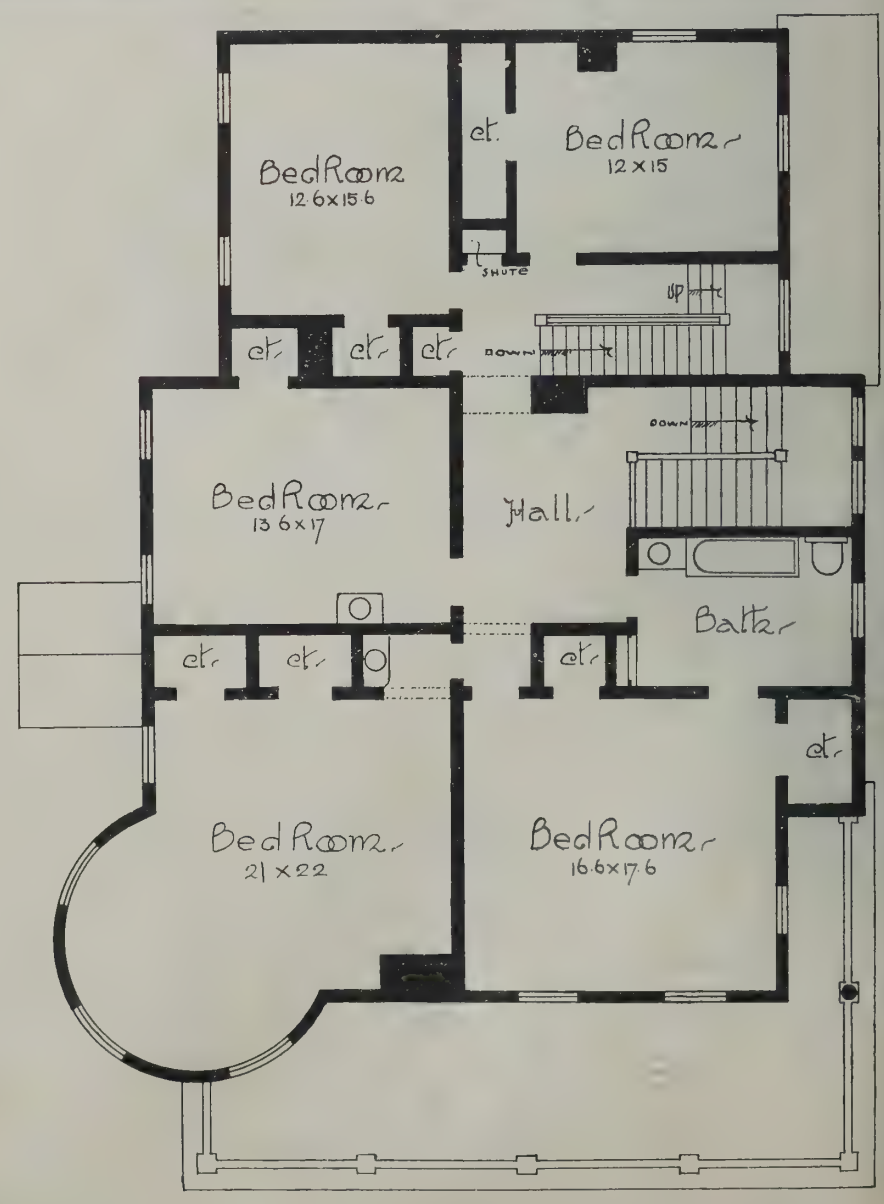


First Floor.



Second Floor.

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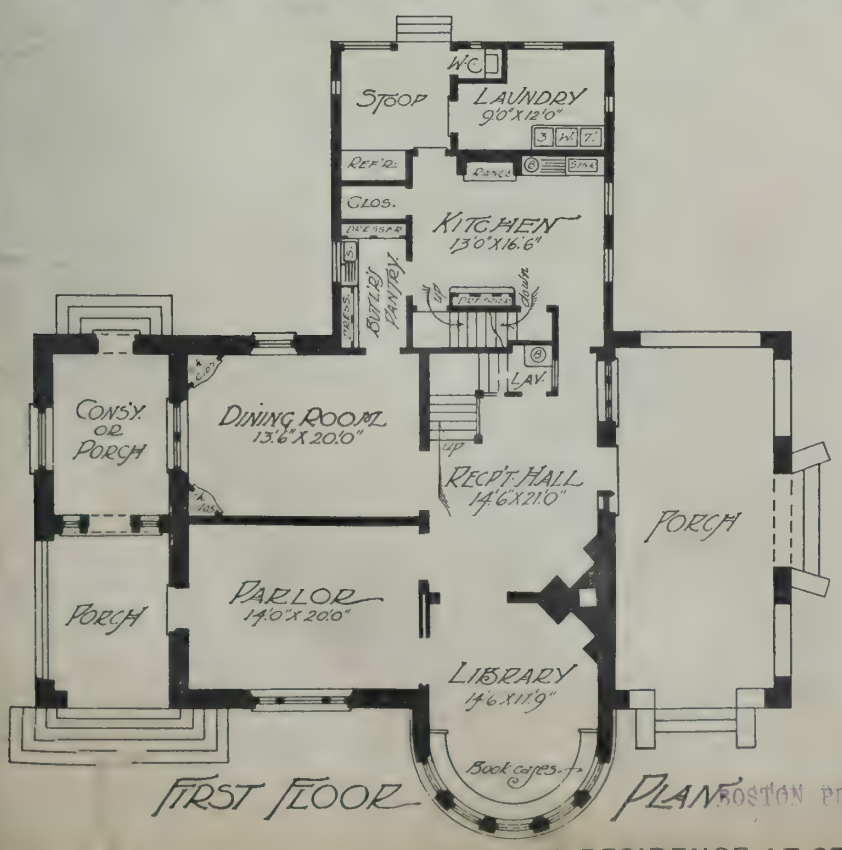
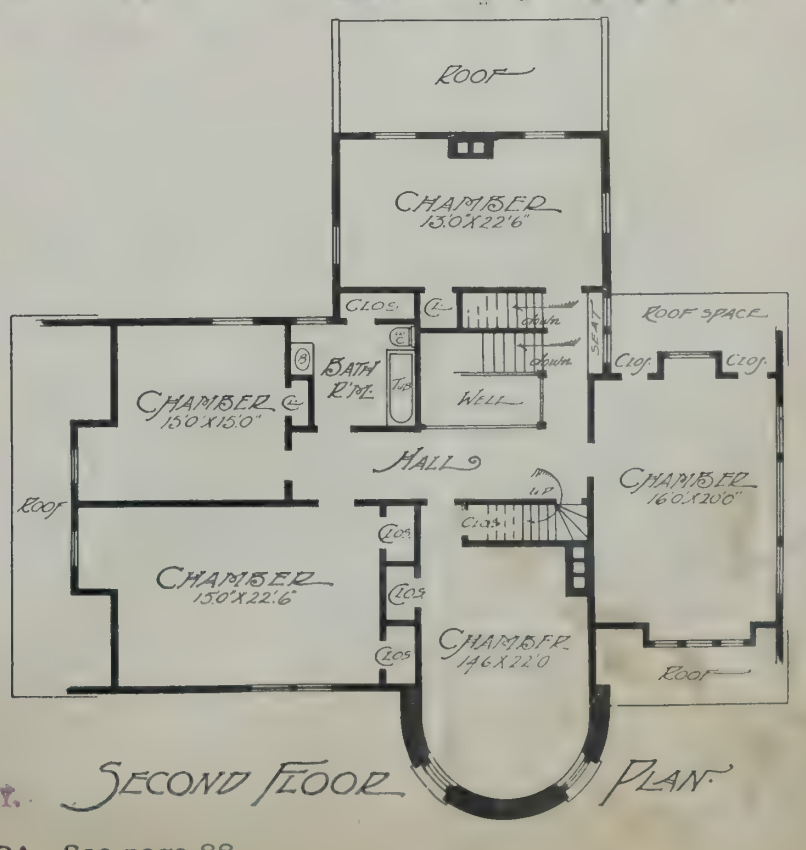
A RESIDENCE AT SCRAN PA.—See page 75.



FIRST FLOOR PLAN.



SECOND FLOOR PLAN.

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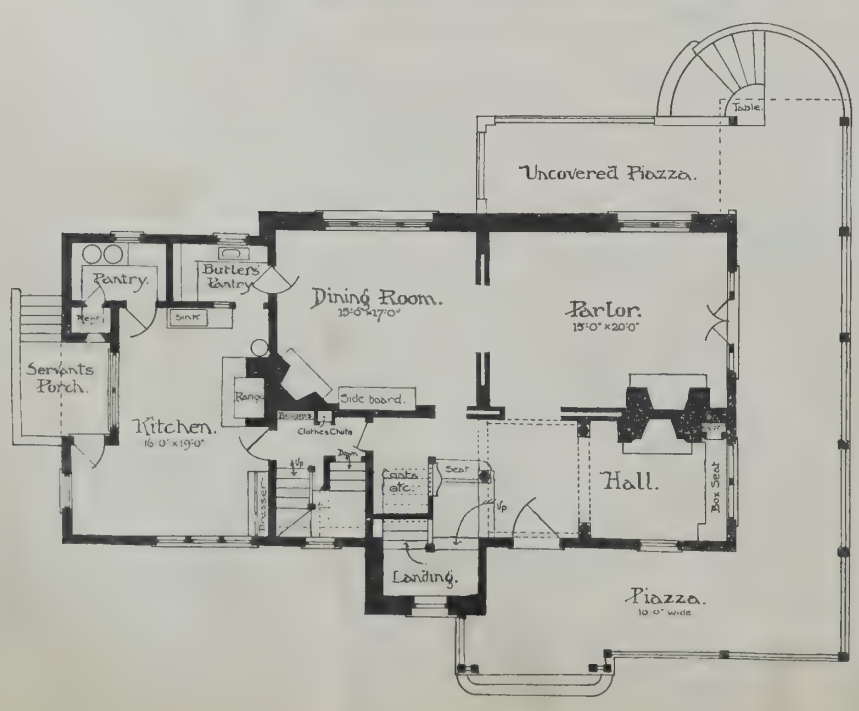
A RESIDENCE AT ST. DAVIDS, PA.—See page 88.



First Floor Plan.

Second Floor Plan.

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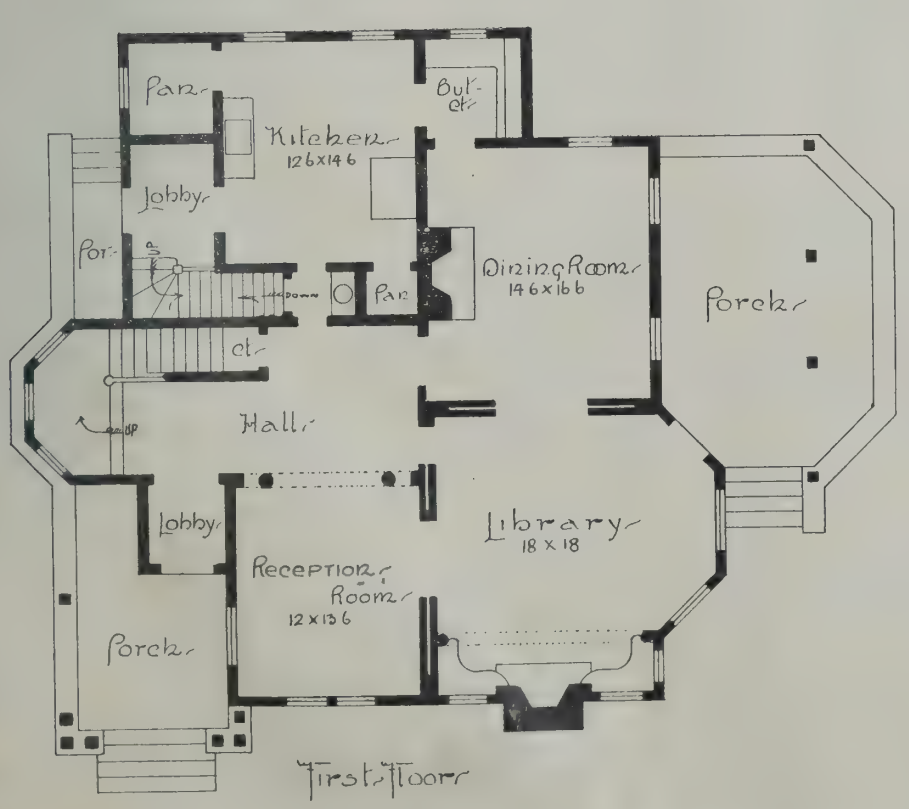
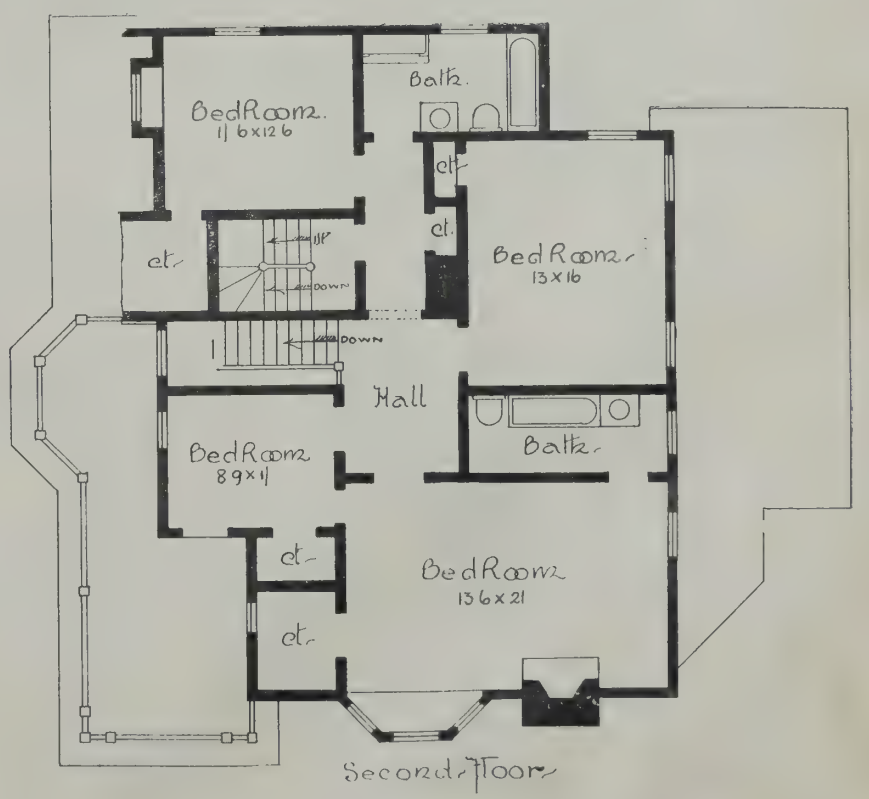
A COTTAGE AT LARCHMONT, N. Y.—See page 88.





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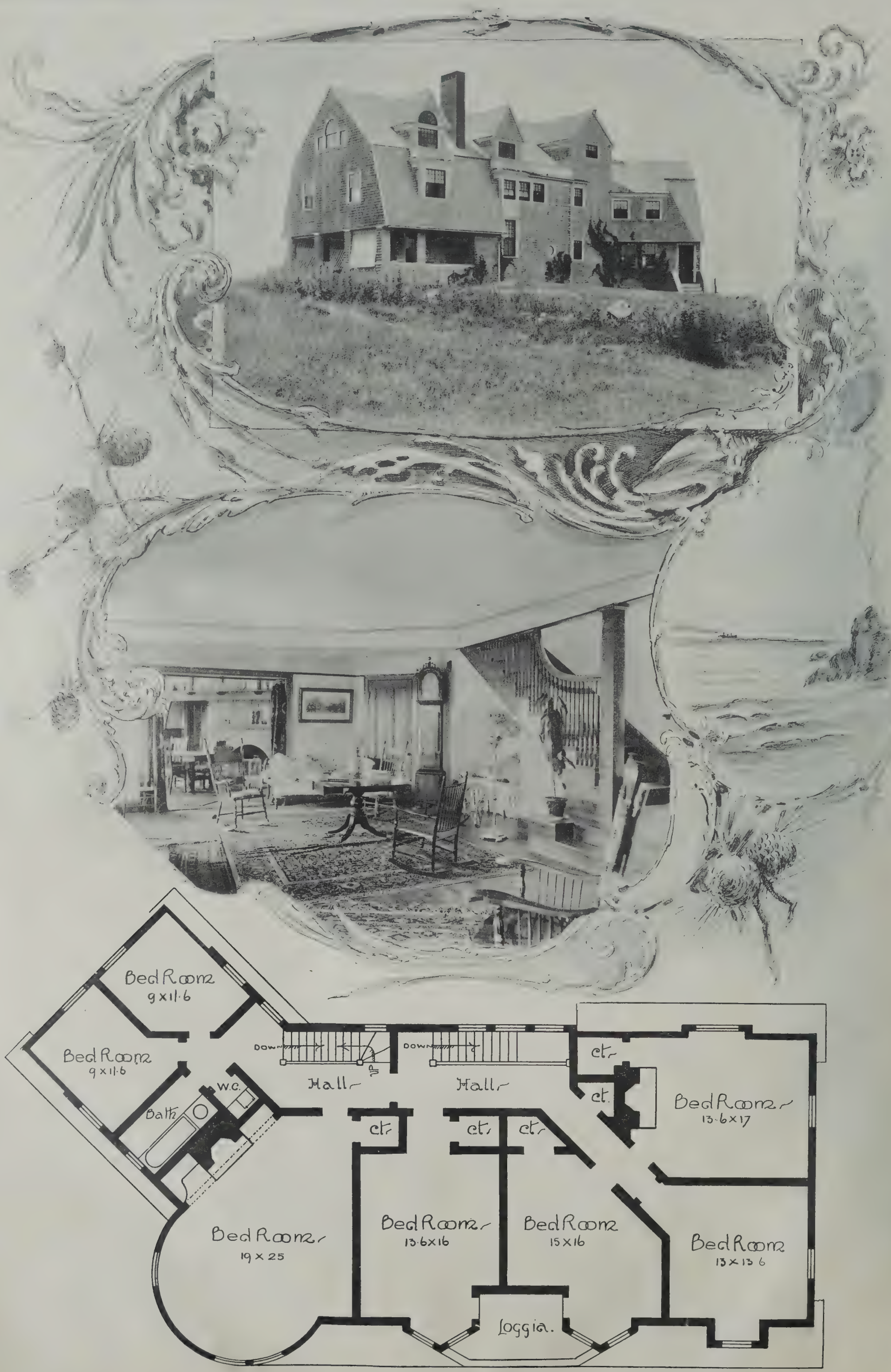
A SUBURBAN COTTAGE AT BOSTON, MASS.—See page 89.



Second Floor.

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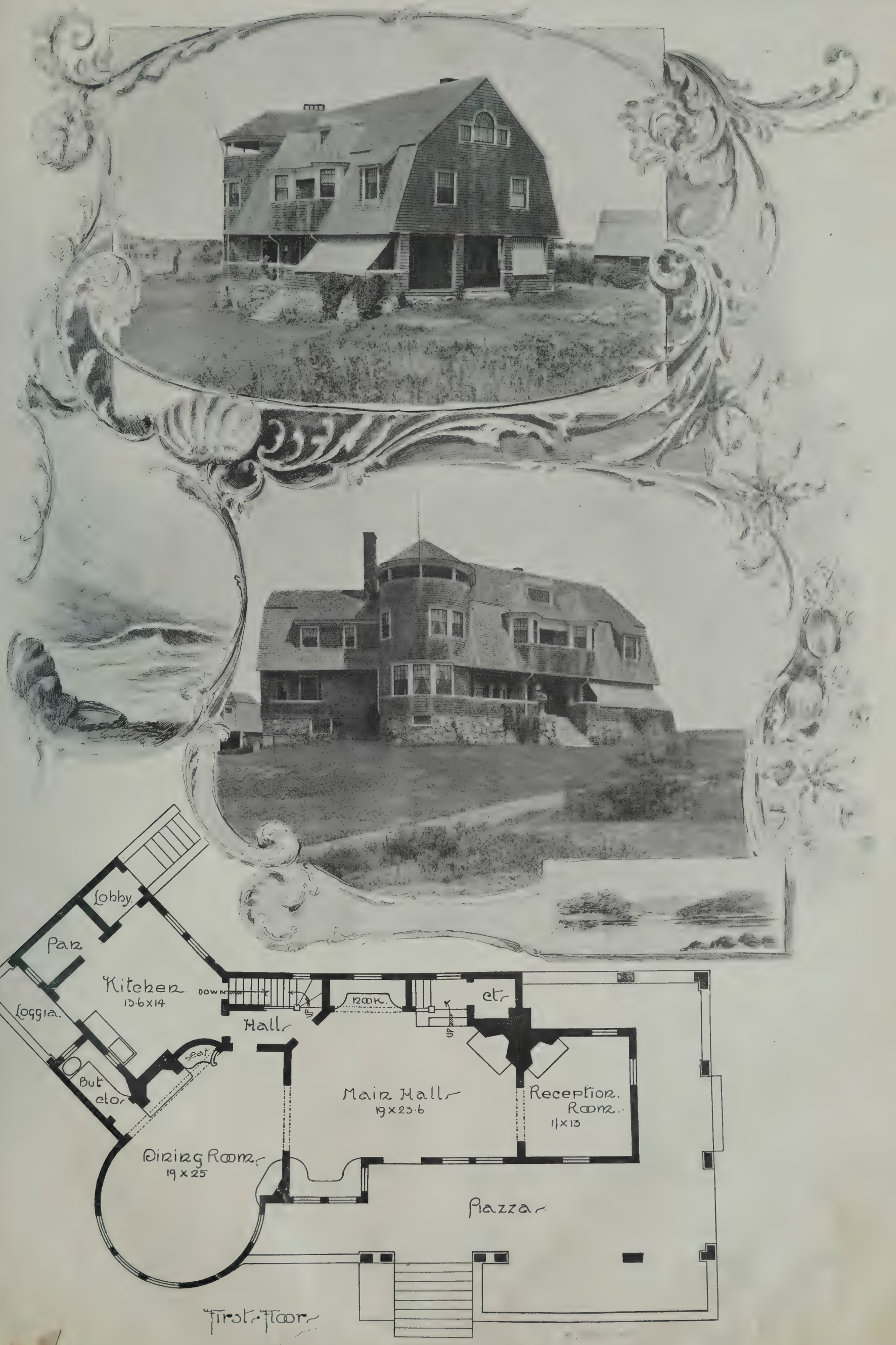
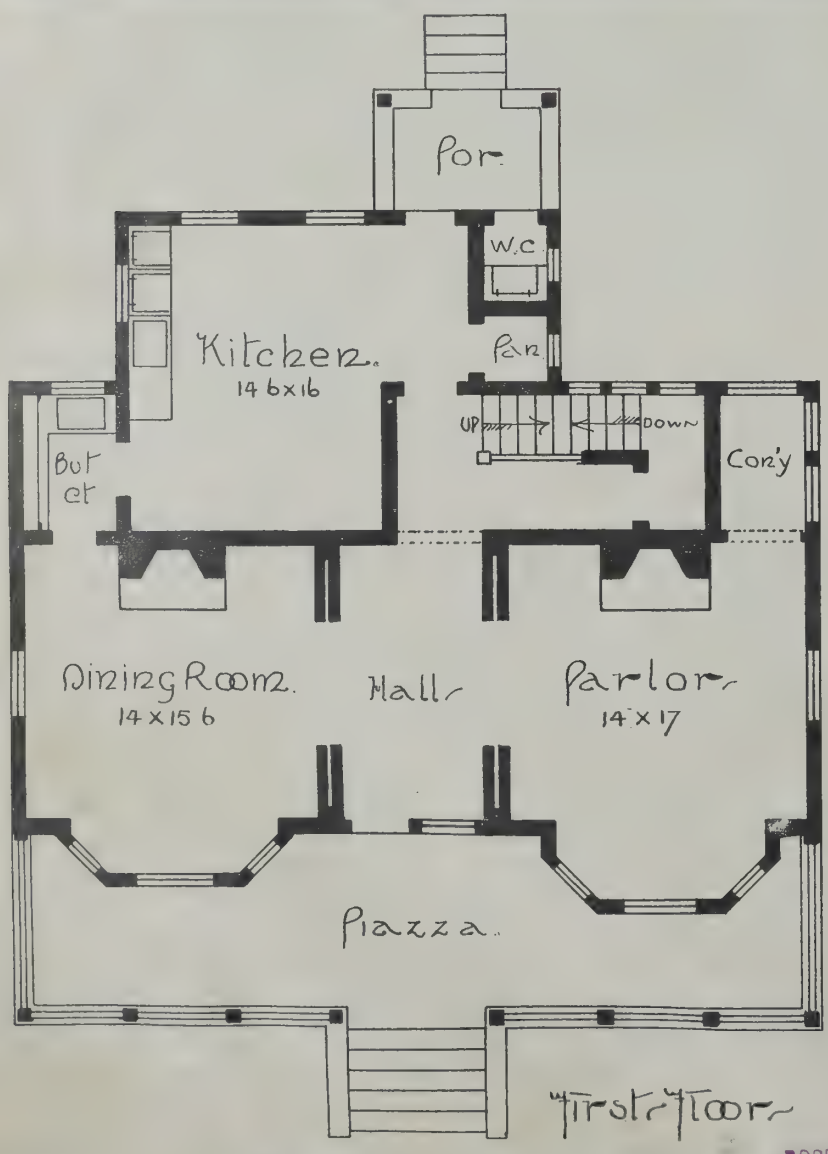
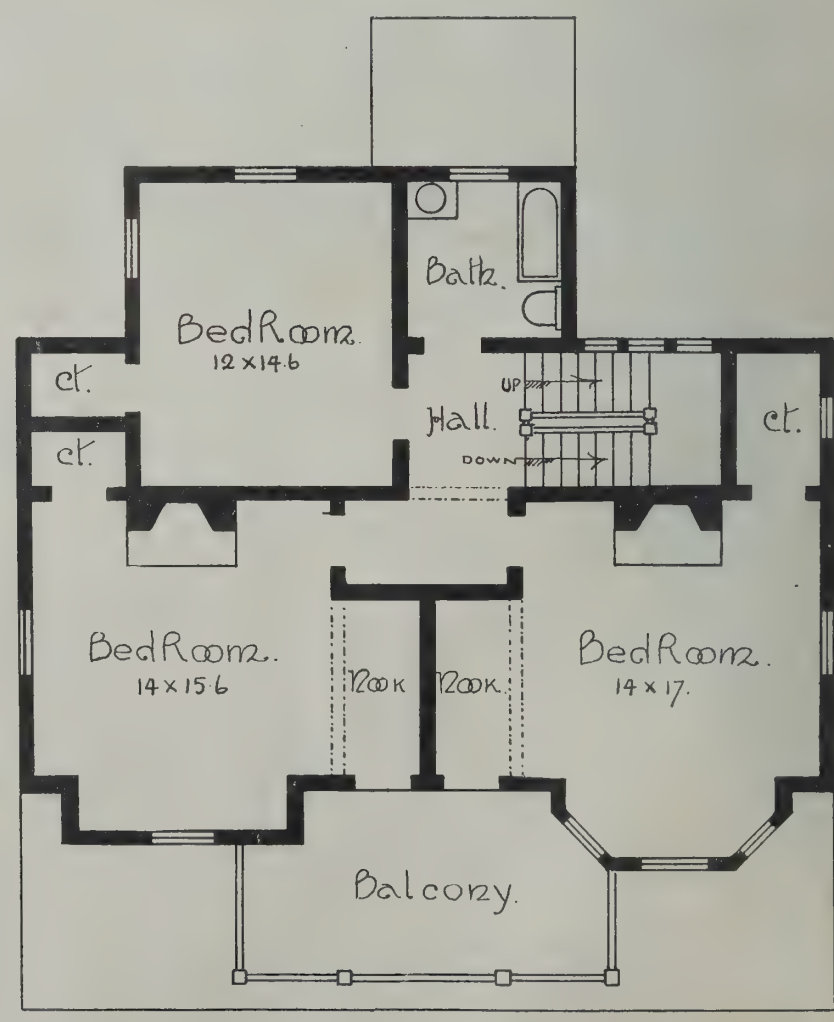
A SUMMER HOME AT KENNEBUNKPORT, ME.—See page 88.



A SUMMER HOME AT KENNEBUNKPORT, ME. -See page 88.





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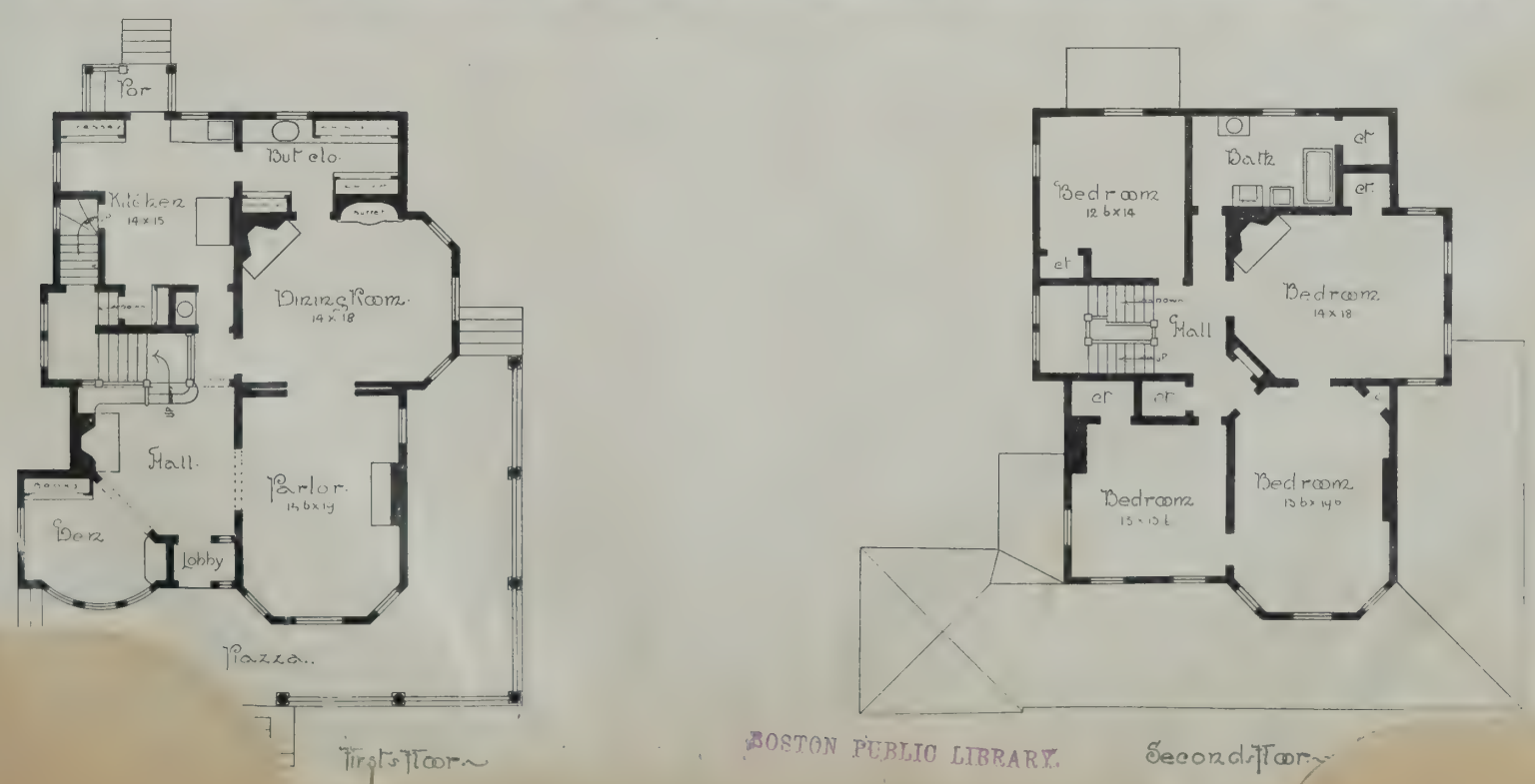
A MODEL DWELLING AT BENSONHURST, L. I.—See page 88.



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A MODERN DWELLING AT ORANGE, N. J.—See page 88.

RESIDENCE AT ST. DAVIDS, PA.

On page 81, we illustrate a residence at St. Davids, Pa., erected by Messrs. Wendell & Smith. The elevations are very effectively treated; the great expanse of roof is relieved by the circular tower feature and broad treatment of the gables and dormers. Underpinning, first story and bay of rock-faced local stone, gray in color, laid with joints well broken, in white mortar; structure above sheathed, papered, shingled, and stained brown, except at entrance gable, which is half tinted, plaster being pebble dash, tinted yellow; trimming color, dark green; sash, red. Dimensions: Front, 65 ft. 10 in, including porches; side, 57 ft. 10 in., exclusive of circular bay. Heights: Cellar, 7 ft. 6 in.; first story, 9 ft. 6 in.; second story, 9 ft.; attic, 8 ft. There is a wide, well shaded entrance porch, with door opening directly on hall, having high wainscot walls in rough plaster, flesh tinted ceiling paneled off with strips. Staircase of easy rise, has square newel same height as wainscot, straight string and turned balusters; angle fireplace in stone; flat-arched opening to library, with bookcase in circular bay feature; similar fireplace; sliding doors to parlor, with wide mullioned window, sides being leaded. Dining-room, with angle china closet, connects with kitchen, containing usual fixtures, through butler's pantry, with sink and dressers Laundry, provided with three tubs in rear. Finish in principal rooms, oak; upper floors, white pine. Second floor plan shows four chambers, all with closets and bathroom, with fixtures complete, of best make. Attic divided off into two servants' rooms and bath, also allowing ample storage space. Cellar, cemented, contains heating apparatus, cold and fuel storage, etc. Horace Trumbauer, Esq., architect, 310 Chestnut Street, Philadelphia, Pa.

Our engravings were made direct from photographs of the building, taken specially for the Scientific American.

A COTTAGE AT LARCHMONT, N. Y.

The engravings on page 82 present a cottage recently completed for Benjamin C. Lockert, Esq., at Larchmont, New York. The design is artistically rendered, and is treated in the English style, half stone and timber. The first story, partly, is built of a silver-gray granite, while the remaining exterior walls at first story are sheathed and covered with shingles, and left to weather finish. The second story is beamed, half-timbered work, and the panels filled in with plaster work. The gables and roof are shingled. Dimensions: Front, 58 ft.; side, 34 ft., not including piazza. Height of ceilings: Cellar, 7 ft.; first story, 10 ft.; second, 9 ft.; third, 8 ft. 6 in. The main hall is trimmed with quartered oak. It contains columns extending to ceiling and forming an alcove provided with bookshelves, paneled divan, and an open fireplace, built of brick. The ceiling is beamed. The staircase, with its broad landings, and newel posts and rail, is one of the principal features. The parlor is a spacious and well-lighted apartment, and is trimmed with sycamore, and contains a fireplace, trimmed with tiled facings and hearth, and a mantel from special design. The dining-room is trimmed with quartered oak, and has a similar fireplace and a buffet built in. The floors are laid with hardwood and highly polished. The kitchen and pantries are trimmed and wainscoted with pine, and are furnished with the usual fixtures complete. The second floor contains a large open hall, four bedrooms, servant's bedroom, and bathroom. This floor is trimmed with whitewood, some of which is stained, while the remainder is painted. Bathroom is treated in china white with tiled walls, and it contains porcelain fixtures and exposed plumbing. Third floor contains three bedrooms and trunk-room. Cemented cellar contains furnace, laundry, and other necessary apartments. Mr. Frank Ashburton Moore, architect, 123 East Twenty-third Street, New York.

Our engravings were made direct from photographs of the building, taken specially for the Scientific American.

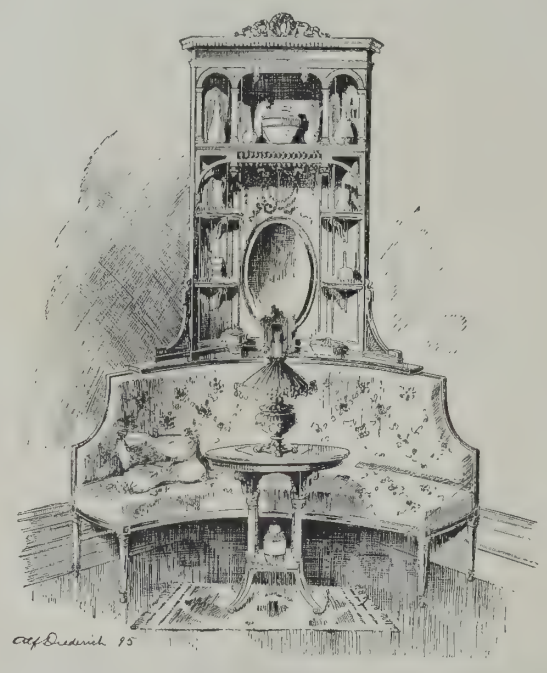
A MODERN DWELLING AT ORANGE, N. J.

We present, on page 87, a modern dwelling recently erected for John McKean, Esq., at Orange, New Jersey. The lines of the exterior are well broken, and the plan is well arranged and finished in a handsome manner. The underpinning is built of brick laid up in red mortar. The exterior framework is sheathed, and then covered with clapboards on the first story and painted colonial yellow, with ivory white trimmings; second and third stories are shingled and stained mahogany color. Roof, shingled and stained moss green. Dimensions: Front, 37 ft. 6 in.; side, 43 ft 6 in., not including piazza. Height of ceilings: Cellar, 7 ft.; first story, 9 ft. 6 in.; second, 9 ft.; third, 8 ft. 6 in. Vestibule is paneled in oak. Hall and den are trimmed with quartered oak, the former containing a paneled divan, an open fireplace trimmed with tiles, and a carved mantel, and a grand staircase with carved newel posts. The archways over stairway, and between den and hall, are provided with ornamental spindle work. Den is provided with bookcases built in, and paneled seat, and is fitted up with stained glass effects. This room and hall have paneled wainscoting. Parlor is treated with china white, and is fitted up with a false fireplace, with tiled hearth and facings, and a mantel of excellent design. Dining room is trimmed with quartered oak. It has a paneled wainscoting, buffet built in and elegantly carved, and a fireplace built of brick and furnished complete. Kitchen and butler's pantry are trimmed and wainscoted with yellow pine, and are furnished with the best modern fixtures. The second and third floors are trimmed with whitewood, the former containing four bedrooms, large closets and bathroom. Bathroom is paved and wainscoted with white English tiling, and provided with porcelain fixtures and nickelplated exposed plumbing. Third floor contains two bedrooms, trunk-room, and billiard-room; the latter fitted up in a handsome manner, with paneled seat in dormer. Hardwood floors. Electric lighting. Cemented cellar contains furnace, laundry and other apartments. Cost, $7 000, including furnace, complete. Messrs. Detwiller & Melendy, architects, Bennett Building, 97 Nassau Street, New York.

Our engravings were made direct from photographs of the building, taken specially for the Scientific American.

COMBINATION CORNER-PIECE.

The accompanying engraving was loaned by the *American Carpet and Upholstery Trade*, and represents a very neat corner-piece. For small drawing-rooms,



COMBINATION CORNER-PIECE FOR LADY'S APARTMENT.
(After the German.)

such as are found in many apartment houses, it is a piece of furniture that might be found very desirable, as it is dainty in design, and occupies but very little space.

A SUMMER HOME AT KENNEBUNKPORT, ME.

We publish herewith in this issue, on pages 84 and 85, the summer home of Captain J. W. Deering, at Kennebunkport, Me. The engravings present a gambrel roof house, of modern treatment, with the lines of the elevations well broken by many good features, executed in an excellent manner, and they include the loggias, the spacious piazza, and the tower and outlook. The underpinning is built up with rock-faced field stone, laid up at random. The superstructure is covered on the exterior with shingles, left to weather finish natural, and the trimmings are painted white. Dimensions: Width, 76 ft.; length, 45 ft., not including piazza. Height of ceilings: Cellar, 7 ft. 6 in.; first story, 10 ft.; second, 9 ft.; third, 8 ft. 6 in. The interior throughout is trimmed with spruce, finished natural, and oiled. The main hall, broad and long, is arranged as the principal living room, and it contains two pleasant nooks, with paneled seats, and an open fireplace, built of brick, with hearth and facings of same, and a wood mantel. The staircase is an ornamental one, with massive columns rising to ceiling. The reception room is conveniently located, and it contains an open fireplace, built of brick, and provided with a dainty mantel. Dining-room, of irregular shape, is furnished with a paneled wainscoting, 4 ft. in height. The walls, above this wainscot, and ceiling are beamed, forming panels, which are filled in with plaster work. The arched nook, with its seat, and fireplace built of brick, and provided with mantel shelf, and paneled over mantel, is a good feature. The floors are of hard pine, laid in narrow widths, and oiled. Kitchen and pantries, and also rear hall, are wainscoted with narrow beaded stuff, and these apartments are furnished with the best modern fixtures. The second floor contains a large, open hall, communicating with seven large bedrooms and bathroom, the latter being wainscoted, and fitted up complete, with exposed plumbing. Third floor contains three bedrooms, and ample storage. Cemented cellar contains furnace, laundry, and other necessary apartments. Cost $8,500 complete. Mr. John Calvin Stevens, architect, Oxford Building, Portland, Me.

Our engravings were made direct from photographs of the building, taken specially for the Scientific American.

A COTTAGE OF LOW COST AT BINGHAMTON, N. Y.

The engraving on page 79 illustrates one of the most artistic suburban cottages at Binghamton, New York, and which has been erected for Mr. Frederick J. Bauman. The design presents a cottage with good elevations of a substantial character, and a plan well arranged, and as equally satisfactory as the former. The underpinning is built of rock-faced ashlar bluestone. The framework is sheathed, and then clapboarded, and painted a silver gray color. The gables are beamed, forming panels, with spaces filled in with rough plaster and stucco work, and with similar trimmings. The roof is covered with shingles and stained a moss green. Dimensions: Front, 29 ft.; side, 35 ft, exclusive of porches. Height of ceilings: Cellar, 7 ft; first story, 9 ft.; second, 8 ft. 6 in.; third, 8 ft. The interior is entered through a vestibule, or lobby, into a main hall, which is spacious, and contains an ornamental staircase with turned newel, balusters and rail, and an open fireplace, with tiled hearth and facings, and a mantel of good design. Parlor and dining-room are well lighted, and are of good dimensions; the latter is provided with a china cabinet built in, with glass doors. The interior throughout is trimmed with cypress, and finished natural. Kitchen is wainscoted and provided with pantry, closet, sink, and all necessary fixtures replete. Second floor contains four bedrooms, ample closets, and bathroom. Bathroom is wainscoted, and provided with the usual fixtures complete. One bedroom and trunk-room on third floor. Cemented cellar contains furnace, laundry, and other necessary apartments. Cost, $1,800, complete. Mr. S. O. Lacey, architect, Phelps Bank Building, Binghamton, New York.

Our engravings were made direct from photographs of the building, taken specially for the Scientific American.

A COLONIAL COTTAGE, ROLAND PARK, BALTIMORE, MD.

The design shown on page 78 is of a cottage of Colonial character, situated at Roland Park, near Baltimore, Md., of direct but pleasing lines and proportions; in all, a happy combination of weathered shingles and gray stone. Trimmings are of light buff, relieved by cream colored sash. The stone pillars at piazza corner give an appearance of stability, which is graced by Tuscan columns between, forming, as a whole, an agreeable introduction, through vestibule, to spacious and impressing reception hall, containing seat at side of oak staircase, which is paneled at side, having square balusters. Arch to library is square headed. Back stairs connecting with main staircase, but sheltered from general view. Cozy angle fireplace in parlor. Dining-room tastefully papered in suitable tints. Kitchen provided with usual fixtures, and connecting with out-kitchen, which forms the purpose of laundry and general household scullery. Dimensions: Front, 39 ft.; side, 40 ft. 6 in, exclusive of piazza and kitchen extension. Heights; Cellar, 7 ft. 6 in.; first story, 9 ft.; second story, 8 ft. 6 in.; attic, 8 ft. On the second floor there are four spacious chambers, each having closet. Convenient bathroom at terminus of hall. Linen closet, with staircase at side, leading to the attic, which contains two bedrooms and facilities for storing. The owner is Miss B. Jenneret. Architect, W. L. Price, 731 Walnut Street, Philadelphia.

Our engravings were made direct from photographs of the building, taken specially for the Scientific American.

A MODEL DWELLING AT BENSONHURST, L. I.

We present herewith in this issue, on page 86, a model dwelling, erected for Myles H. McNamara, Esq., at Bensonhurst, L. I. The design presents a pleasing exterior elevation, and a well arranged plan, with a central hall and rooms on either side. The underpinning is built of brick. The exterior walls are covered with sheathing and paper, and the first story is clapboarded, while the second and third stories are shingled. It is painted light gray with a brownish gray trimming. The roof is shingled and painted a moss green. Dimensions: Front, 38 ft.; side, 33 ft., exclusive of piazza. Height of ceilings: Cellar, 7 ft.; first story, 9 ft.; second, 8 ft. 6 in; third, 8 ft. The interior throughout is trimmed with white pine finished natural. The staircase hall, containing an ornamental staircase of oak, is separated from central hall by a spindle transom and archway. The staircase is lighted effectively by a cluster of stained glass windows. Parlor and dining room are provided with open fireplaces, and furnished with tiled hearth and facings and mantels. Kitchen and pantries are wainscoted with narrow beaded stuff, and are fitted up with the usual fixtures complete. The conservatory off from parlor is a good feature. The second floor contains three bedrooms, large closets and bathroom; two of the former having open fireplaces with tiled fixtures. Bathroom is wainscoted and fitted up with the best modern fixtures and exposed plumbing complete. Third floor contains three bedrooms, cedar closet and ample storage. Cemented cellar contains furnace and other necessary apartments. Cost $5,000 complete. Parfitt Brothers, architects, Garfield Building, 26 Court St., Brooklyn, N.Y.

Our engravings were made direct from photographs of the building, taken specially for the Scientific American.

A SUBURBAN COTTAGE AT BOSTON, MASS.

The engraving on page 83, in this issue, illustrates a model suburban cottage, which has been erected recently for Mr. William B. Merrill, at Newton Centre, Boston, Mass. The site is an attractive one, at the side of Newton Lake, and this adds much beauty to the already picturesque design, which is well ornamented by a pleasant porch on either side of house, and a chimney which is a feature in itself. The chimney, balustrade at porches, and underpinning, are built of field stone laid up at random in a neat manner. The exterior framework above is covered with sheathing, paper, and then shingles, and stained a mahogany color. The trimmings and blinds are painted bottle green. Roof shingled. Dimensions: Front, 45 ft.; side, 44 ft., exclusive of porches. Height of ceilings: Cellar, 8 ft.; first story, 9 ft.; second, 9 ft.; third, 8 ft. The entrance is through a paneled lobby five feet square. The main hall is trimmed with oak. It has a paneled wainscoting, columns between reception room, rising to ceiling, and forming an arcaded effect, and an ornamental staircase with a broad landing, and bay window thrown out, giving ample light and ventilation. The reception room is treated with china white, dead finish, and in a dainty manner. The library is trimmed with oak, and it contains an octagonal projection thrown out, and a pleasing nook with seats, and an open fireplace trimmed with tiled hearth and facings, and hardwood mantel with columns and mirror. The dining-room is trimmed and furnished similar to library. Kitchen and pantries are trimmed and wainscoted with whitewood, and are furnished with the usual necessary fixtures complete. The second floor is trimmed with whitewood, and it contains four bedrooms, large closets, and two bathrooms. The bathrooms are treated with white enamel, and are fitted up with porcelain fixtures and exposed nickelplated plumbing. The third floor contains billiard room, one bedroom, and trunk room. Cemented cellar contains furnace, laundry, and other necessary apartments. Mr. Bertrand E. Taylor, of the firm of Rand & Taylor, Kendall & Stevens, 87 Milk Street, Boston, Mass., architect.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

ARTISTIC WALL PAPER.

Nevius & Haviland, of New York, a branch of the National Wall Paper Company, issue some very neat folders illustrating designs of wall decorations, as carried out in their products. Our illustration, copied from one of these views, shows a hall in which the wall and frieze are thus treated, to give the effect of iron ornament and grille. In these papers every effort is made to secure what is accurate and correct in the school of decoration represented, both in color and design. All of the designs are modern, practical, and appear at their best when actually in use in the rooms for which they are designed.

BEAUTIFUL EFFECTS OBTAINED WITH ARTISTIC WALL PAPER.

Points for Young Contractors.

There is a class who, with inborn wish to succeed and to make the world brighter and better, before commencing business study for years their work in its every phase, its every form, and give it—their chosen lifework—the full consideration and deliberation that it deserves; these, when they do start out, instill confidence, and in confidence get better prices and more satisfactory settlements than the men who, without previous preparation, assume to take contracts because they were dissatisfied workmen.

It is to this class of ambitious men that these words are addressed, especially to those located in places outside the larger centres of civilization, when the question of what or what not to do, as preparatory for the future, is often a very serious one with many young men in the building trades, in whose breasts is firmly implanted a desire to excel. I do not want to be interpreted as saying that a building mechanic suddenly thrown out of work should do nothing till some contractor shall give him work—that he must not take work direct from the layman himself—far from it; let him do anything and everything in his power to make an honest dollar; but I do most strongly dissuade him from thinking of becoming a permanent contractor or firm, himself as principal, taking anything except small repairs and such like, unless he be thoroughly equipped for the work. This for his own good. In regard to the omnipresent genius of dissatisfaction, the sooner he taketh his departure for the sunny slopes where the woodbine twineth, the better for all.

A contractor to be successful in turning out good work and in making money must possess a great amount of practical ability; he must thoroughly understand, practically, every branch of his work in its ever-changing phases; besides, he must have acquired a fair smattering of the theoretical side, to understand, if not to calculate, the laws of strength and stability. If he be a bricklayer, he must have an idea of the principles of foundations, arches, piers, buttresses, etc., besides a rough knowledge of the chemical and physical properties of limes, cements and other materials. If he be a carpenter, a knowledge of the governing principles of roof and other trusses, beams, columns, etc., is indispensable, and an intimacy with the nature of woods is also essential. If he be a plumber, a familiarity with sanitary science and an insight into the laws of traps, vents, flow of water, and a hundred and one other points are imperative; and so on through every trade; in short, we are brought face to face with the survival of the fittest ultimatum—that to attain to full success a contractor must understand all about his particular line of work that he can learn by watchful experience and by incessant, unremitting study during his spare moments.

It may be said that it is impossible for a contractor to study any theory because his education is, as a rule, such that it does not fit him to understand formulas and technical terms, and, even could he elucidate them, he, as a rule, cannot spare the time. All that can be said in reply is, that if he has the slightest desire to get to the top of the ladder he will find the time or make it, and he will repair or replenish his education up to the point which is necessary to understand the said formulas and technical terms. This can be no very difficult task, for in the market there are hundreds of plain, simple, reliable books on each trade, easily gotten hold of and as easily understood, teaching the computation of strains and how to meet them, the guiding rules, etc., in such simple form that the most ordinary education can fully grasp them. Then, again, he will contribute greatly to his own interests by subscribing to a couple of trade journals devoted to his own line, and to at least one architectural paper. These will keep him in touch with new methods and practices being perfected or brought out, and with newly introduced materials, tools, and other mechanical devices. In addition, he should be the possessor of a library of trade catalogues, which he should study carefully and repeatedly. Technical journals supplemented by trade catalogues are without doubt the very best educative mediums that a contractor or mechanic can possess. The more knowledge a contractor can acquire the more confidence he naturally will receive from his employés, and this knowledge he should try as far as possible to transmit to them; he should endeavor to make them thinkers and students as well as workers.

A thorough acquaintance with business methods is imperative. Bookkeeping, banking, exchange, correspondence, etc., should be to the contractor familiarities. This knowledge can be easily acquired if both eyes be kept open and a little assistance be sought from some qualified friend, or a short time might be profitably spent in some good business college, no more than merely enough to acquire simply a rough proficiency in business practices; more would only be a waste of time. On this score of business methods the embryo contractor need suffer no uneasiness, for these points are so very easily acquired and from so many sources.

Then there is what may be called the legal aspect. An acquaintance with the law relating to contracts, liens, garnishes, etc., will always save a great deal of troublesome uncertainty and worry. A wonderful amount of information on this point may be obtained from reading the various technical journals. That this is a point of great moment to contractors as well as to architects seems to be recognized by these papers, which are giving a good deal of attention to it by publishing particulars in general, and judgments in building cases. Take an interest in and carefully follow all trials of building cases that you possibly can, especially those in your own locality, and note the legal points brought out by counsel and judge.

It is, of course, necessary before beginning business, to have a certain amount of cash capital, at least enough to carry through the first few jobs till returns begin to come in, and in no case should the beginner allow himself to be seduced into taking more work than his capital will warrant, no matter how glittering the prospect, no matter how sure the success may appear. His ability and willingness from the start to pay promptly for materials will engender confidence in and reliance on him by the supply dealers, and when he comes to take larger contracts it will be pleasantly surprising how his custom will be sought, and how much better the bargains he can make than can his slipshod brother contractor who has no such reputation.

Estimating correctly is a very vital point with any contractor. A faulty estimate may mean a very heavy loss, or it may be the means of throwing him out of the work. Estimate carefully, considering every point in the plans and specifications; miss nothing. Low estimates are often caused by an improper conception of what is to be done, a loose consideration of the values of different features; get the quantities and qualities correct, and the values as low as possible, and if this does not secure the work, let the other fellow have it, and welcome. Never sign a contract before again considering the amount and class of work to be done and materials to be supplied, and should at any time some unscrupulous proprietor request

that the job be taken at a certain reduction from the tendered price, don't jump at it! Consider it first; don't take work for the sake of work. When figuring make out the quantities in tabulated form, entering every article, every item, with its estimated value opposite, all being done in a regular form—each proposed job separately. Whether the job be secured or not, keep all of these estimates in some permanent shape, for they will be a record of the past and a valuable guide for the future. While the work is progressing for each building separately, keep track of every article sent to the ground, every article returned, and a correct account of all labor spent on the work; enter the cost opposite each item. This record will fill a twofold purpose—that of showing the relation between estimated and actual cost, being the loss or gain on the whole or on each item, and also teaching a most valuable lesson for future tendering.

Study the markets, the rise and fall in prices of materials, not only in your own line, but, generally, in all other lines, and particularly see that the technical journals you subscribe to give you the regular market quotations up to date; of course discounts and freight rates change the face of matters considerably, but the prices quoted will always be a safe criterion by which to follow the everchanging tide of values. These quotations are customarily given for the largest market, and which are always specifically designated. Most certainly, when it comes down to buying, correspondence must be resorted to. By the way, let me add that another benefit of the library of technical journals is that they tell in their advertising pages the names and addresses of the principal dealers in each line; this fact alone is worth the subscription price to any contractor.

In regard to extra work, a little advice might not be out of place. When a proprietor or his agent, who is as a rule the architect, suggests changes, additions or deductions, at once look up the specifications and see exactly how the matter stands, and do not make such deviation from the amount or class of work contracted for until you have first amicably adjusted with the proprietor the price that is to be added to or deducted from the contract amount; then you will know how you stand, and the proprietor will know how he stands, and there will be saved all the untold squabbles, and dissatisfactions over the "extras" at the final settlement. A contractor has duties to his employer as well as to himself; this he should always bear in mind. The better he can satisfy his employer the better it will be for his reputation now and to come; one dissatisfied proprietor will by far outdo the good that ten satisfied ones can do him, and he will usually try to do it, too. When I advise trying your level best to satisfy the proprietor, I do not say to exceed the specifications, for that is uncalled for, but success can only be obtained by conscientiously filling them to the last letter.

The relation a beginner bears to those previously established in his line in the same locality is at first on the part of the old heads often one of suspicion. This is human nature. To speculate on his qualifications, his resources, his everything, is only natural in those to whom he is now to be a rival. Barriers may be thrown in his way; but what of this? Fair, square dealing will outlive all. Keep a stiff upper lip; be honest to all, and fear none. This procedure, if conscientiously lived up to, will give to any man a certain noble personality, a certain impress of absolute reliability that all the storms of adversity or enmity cannot shake, that will stamp that man as a man among men, and success is assured.—David G. Baxter, in *Canadian Architect and Builder.*

VANDERGRIFT, PA.

The Apollo Iron and Steel Company, of Pittsburg, Pa., is establishing a model manufacturing town, and one which will, apparently, have many independent advantages as a place of residence, at Vandergrift, on the Kiskiminetas River, thirty-eight miles from Pittsburg. The object of the company, primarily, is to obtain greatly enlarged facilities, and unlimited opportunities for growth, for their very extensive manufacturing business in galvanized sheet iron, open hearth steel ingots, slabs, and billets, terne plate, and cold rolled, smooth finished iron and steel sheets. Our illustration shows the interior, not yet filled with machinery, of one of the new structures at Vandergrift, the converting building, an all-steel construction, 1,120 feet long. Other buildings on an equally large scale are now well advanced toward completion and equipment, and a beautifully located, perfectly planned town is being rapidly built up. The company has made ample provision for good sewerage, good streets, good water and gas supply, and it is not surprising that lots in the new town have sold very fast. The titles of lots have in all cases been restricted to effect the absolute prevention of liquor selling. The new town is expected to furnish homes at once for about a thousand men and their families.

NEW CONVERTING BUILDING, ALL STEEL, OF APOLLO IRON AND STEEL COMPANY.

ORNAMENTAL ARCHITECTURAL IRON WORK.

The Champion Iron Company, of Kenton, Ohio, has had a large and varied experience in the construction of high-class work, such as called for in the advanced building operations carried on in all our large cities during the last few years. The illustration represents a pedestal and portion of column, one of two or three designs made by the company for the new Custom House at Pittsburg, Pa. The company has an extensive plant, and is thoroughly equipped for handling any quality of ornamental and structural iron work, also furnishing work in electro-bronze and the oxide finishes. In the handsome catalogue published by the company, the handsome stairwork, railings, grilles, etc., made, are shown to great advantage.

ORNAMENTAL PEDESTAL AND BASE OF IRON COLUMN.

Good Roof Paints.

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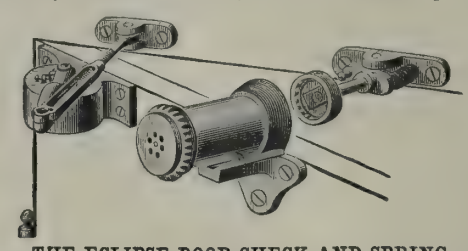
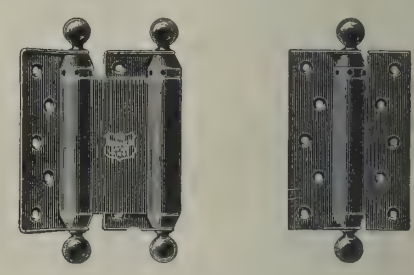


THE ECLIPSE DOOR-CHECK AND SPRING.

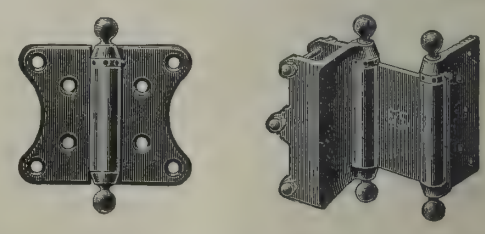
and easily kept in order after it is on the door. We show an illustration of it herewith. It is practicable, effective, and durable; should any of the parts happen to be broken they can be replaced at small expense without sending the whole appliance back to the factory. Where the Eclipse is used, the closing door does not slam and shake the whole house, to the great injury of the nerves of the occupants. There is no building that does not have use for this air check. Stores, dwellings, churches, schools, public halls, should all have it applied to their doors. A use for the Eclipse which is becoming more general, is on the doors between the kitchen and the dining-room. By this use of it, the odor of cooking is kept out of the other rooms of the house, and the slamming of doors does not disturb the family while at the table. Sargent & Co. have an "Eclipse Booklet," which they would be pleased to send to those interested.

BOMMER SPRING HINGES.

Considering the beauty in design and finish of modern hardware, it is surprising to note the clumsy fixtures still in use for closing doors. The most artistic entrances, where lightness, elegance, and beauty should of all places in a building extend their silent welcome, are often marred by their utilitarian hideousness. Utility is good, but utility combined with beauty is better. It is for this reason that the Bommer Spring Hinge, manufactured by Bommer Bros., 351 Jay Street, Brooklyn, N. Y., has become the favorite of both the man of taste and the practical man. The novel manner of forming up the leaves of the Bommer Spring Hinge from steel, bronze, or



brass, under enormous pressure, and in such a manner that a section in the line of the greatest strain shows a deep, sharp double corrugation, gives great structural strength, and, as the World's Fair award aptly says, makes them "practically unbreakable," while the inbending of the edges of the side flanges forms a gauge for



applying double action hinges, giving absolute certainty of a fair swinging door as a result, and saving time in hanging. By ingenious construction the disadvantage of the softness of the metal in bronze and brass hinges is entirely overcome, all the wear being thrown upon the interior steel skeleton, making them as durable in every respect as the same goods in steel, while, by using the compound spring, the power is increased, yet rendered more elastic, giving that easy movement to the door for which the Bommer Spring Hinge has become famous.

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"Sun Stoppers" is the title of a neat little catalogue issued by the Willer Manufacturing Company, of Milwaukee, Wis., makers of sliding, folding, and Venetian inside blinds, window screens, screen doors, etc. The business has been brought to great nicety by this company, whose productions have a high reputation. Builders and architects will do well to send for this catalogue, and most readers will be surprised at the great amount of information it contains.

SCIENTIFIC AMERICAN.

Building Edition.

A RESIDENCE AT OVERBROOK FARMS, PA.

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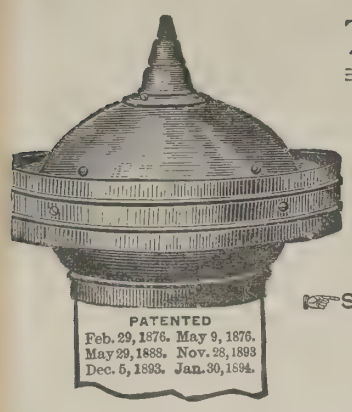

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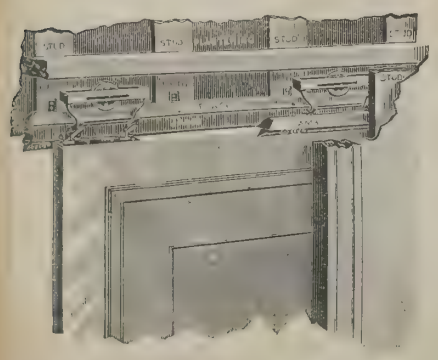

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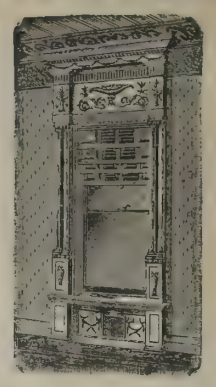

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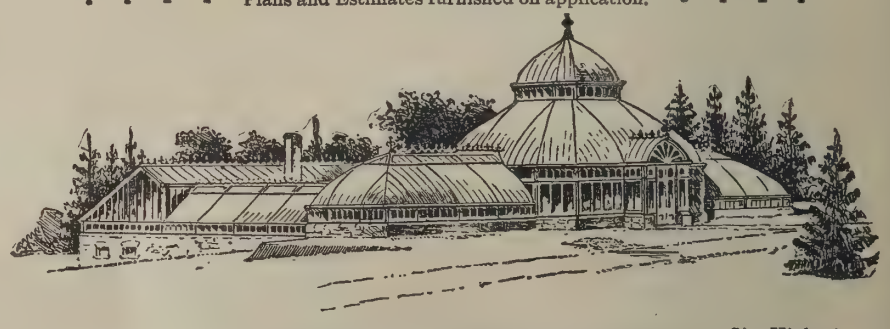

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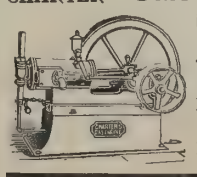

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☞ See Classified List of Advertisers in present Number on pages xiii and xiv.
☞ See Alphabetical Index to Advertisers in present Number on page xii.

SCIENTIFIC AMERICAN.

Building Edition.

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PUBLISHED MONTHLY.

Vol. XXII. No. 6. NEW YORK, DECEMBER, 1896. Subscription, $2.50 a Year. Single Copies, 25 Cents.

SCULPTURED COAT-OF-ARMS AND SPHINX AT VEITSHÖCHHEIM CASTLE, GERMANY.

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STATUES IN GARDEN OF VEITSHÖCHHEIM CASTLE, NEAR WÜRZBURG, GERMANY.—See page 92.

Scientific American.

ESTABLISHED 1845.

MUNN & Co., Editors and Proprietors,

No. 361 BROADWAY, NEW YORK.

NEW YORK, DECEMBER, 1896.

THE

Scientific American,

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Of the December Number of the

SCIENTIFIC AMERICAN, BUILDING EDITION.

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"FIRE-PROOF."

In using the word "fire-proof," when speaking of the construction of buildings, it should be remembered that it is a strictly relative term. It is not likely that the author of the most completely worked out scheme of fire-proofing would claim that it was absolutely effective. And, indeed, the behavior of buildings of this class that have been subject to the test of a severe conflagration, has shown that such fire-proofing as has been carried out in their construction was only half done, and was not justly entitled to the name. Perhaps the most striking evidence of this was the partial destruction of the Manhattan Savings Institution building last year during a fierce conflagration, which occurred at the corner of Broadway and Bleecker street. This was one of a class of so-called fire-proof buildings, which were erected under a law which allowed the erection of lofty structures provided they embodied certain elements of fire-proof construction. The tenants, whose property filled the various floors, left them on the night of the fire with the sense of security which attaches to the term fire-proof; but they came next morning to find the upper half of the building a blackened shell, full of twisted beams and the crumbling rubbish of fire-proof floors. The appearance of the ruins showed, as we have stated above, that the term fire-proof can only be relatively applied to such a building. As compared with the ruins on the corner of the opposite block, the Manhattan building, it is true, demonstrated the value of protection as far as it had been carried out. These buildings were of the ordinary construction, with masonry walls and wooden floors, and they were completely gutted, the very walls themselves having fallen; whereas, the greater part of the shell and many of the lower floors of the fire-proof building were practically intact, so much so that they are in the restored building as it stands to-day. On the other hand, the fact that the Manhattan building caught fire by the mere radiation of the heat from a burning structure sixty feet away, and that the fire burnt through several intervening floors, shows that it was not proof against attack from the outside, and that it was not able to localize the fire when it had once shaped.

It is but just to state that the building in question was erected several years ago, when the theory and art of fire-proofing was not so well understood and carried out as it is to-day. No first-class building would now have its main floor-girders resting upon brick piers, certain if they should sag down under the heat of the fire, as these did, to pull away from their supports; nor would the lower half of these girders project below the ceiling line and be left, as these were, without any fire-proof coating whatever. It is certain, however, that there are some features of fire-proofing which could be improved upon even in the best of our wooden buildings that are going up to-day. The most vulnerable feature in the lofty buildings of fifteen to twenty stories, that lift their heads far above the surrounding structures, is this vast area of wall, pierced by windows, unprotected by any kind of fire-proof shield, which would be assailed by the flames and flying debris of an adjoining fire. If the mere radiated heat of a fire sixty feet away was powerful enough to ignite the Manhattan building, what hope would there be of keeping the fire out of the upper portion of a structure like the twenty-story American Surety building, if it were surrounded by a raging sea of flames from the adjacent ten-story Schermerhorn block? The result is one that is open to conjecture only; for, as far as we know, none of the many lofty structures that are similarly situated has ever been put to the test—a matter for which their owners and occupants may be devoutly thankful.

Another element of danger against, which proper provision is rarely made, is the facility for the spread of a fire from floor to floor which is offered by the elevator shafts. All the good results which are obtained by an absolutely fire-proof floor in localizing a fire are liable to be rendered useless by the free communication between floors which exists by way of the elevators. This defect, which we think is a very grave one, could be remedied by providing each landing with a set of sliding doors of fire-proof construction. These could be made of sheet steel and filled with some asbestos composition. They would not be inconveniently heavy, and they could be so hung as to be capable of being quickly closed, thereby shutting off the floor on which the fire occurred from any communication with the rest of the building, at least by way of the elevator shaft.

The ideal fire-proof building should fulfill three conditions:

1. It should be proof against attack from without. This condition can be secured by reducing, as far as convenient, the window space; building the walls with a facing of the very best fire-brick, and furnishing every window with a plate or roller shutter of steel, or with an interior asbestos curtain.

2. The skeleton frame should be inclosed in some thoroughly fire-proof material, such as high-class fire-brick, leaving a space between the brick and the metal that can be filled in with some form of asbestos.

3. It should be able to localize a fire. This can be obtained by building steel and fire-brick floors, with cemented finish, abolishing all woodwork, and using metal for doors, window casings and sashes, providing fire-proof doors on each floor for closing the elevator shafts, and, lastly, placing on each floor a powerful water supply. Such a structure would come as nearly as possible to being fire-proof in the absolute sense of the term.

A TOWN RESIDENCE IN NEW YORK CITY, N. Y.

The building illustrated in the engraving herewith, on page 98, presents a residence erected for Gov. P. C. Lounsbury, on West Seventy-second Street, New York City, N. Y. It is twenty-two feet wide and sixty-nine feet deep, including bay windows, but exclusive of front porch and steps. The basement and first story front are built of brownstone, with faces left rough as they come from the quarry. The entrance to porch is flanked on either side by fluted columns, and the balustrade and posts to same are carved in a handsome manner. The bay windows above are built of similar stone, dressed, and ornamented with carved panels, columns, etc. The remainder of the front is built of pressed brick. The roof is slated, and is finished with a terracotta cresting. The materials are of the best quality of their respective kinds, and the workmanship is first class. The interior is arranged in a most convenient manner, and is furnished throughout with hardwoods. The front windows are glazed with polished French glass. The vestibule wall has a paneled wainscoting in mahogany, and the floor is laid in mosaic. The main hall is trimmed with dark red mahogany. It has a wainscoting in panels and a handsome console mirror. The stairway, which stands well back in hall, has a massive carved newel. Parlor and music-room are also trimmed with mahogany, and they are separated by pilasters with carved capitals, the space between being provided with a transom, filled in with a spindle screen. The fireplace has facings and hearth of tiles, and a massive carved mantel, with beveled plate mirror extending to ceiling. Dining-room, spacious and well lighted, is trimmed with quartered oak, and it is furnished with a paneled wainscoting and a floor laid in parquetry. The fireplace has a mantel made from a special design, with fluted columns and tile trimmings. The buffet is built in with columns, etc., to match the mantel. The butler's pantry is finished in oak, and it contains bowl, drawers, cupboards, and dumb-waiter. The second floor contains a library trimmed with mahogany, and a bedroom finished in ash. Library is provided with bookcases, seat and fireplace. This floor also contains a bathroom, wainscoted in oak, and fitted up complete. The dressing-rooms are provided with bowls, mirrors, and spacious wardrobes. Third floor, trimmed with whitewood, contains two bedrooms, dressing-rooms, large closets, linen closets, and bathroom, and the fourth floor contains billiard-room, trunk-room, and two bedrooms. Basement contains breakfast-room, kitchen, laundry, and pantries, furnished with the usual fixtures in the best possible manner. Cemented cellar contains the furnace. Messrs. Thorn & Wilson, architects, 1267 Broadway, New York City, N. Y.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

STATUES IN THE GARDEN OF VEITSHÖCHHEIM CASTLE, NEAR WÜRZBURG.

The castle at Veitshöchheim, situated about an hour from Würzburg, is small and unpretentious, but its great garden, with the numerous sculptural decorations, is very fine. During the lifetime of Joh. Phil. Franz von Schönborn (1719 and 1724), it was changed, after the plans of Balthasar Neumann, from a zoological garden to a pleasure garden, but was not given its present form until the time of Adam Friedrich von Seinsheim (1755 and 1779), under the direction of the younger Neumann.

The groups and statues represent the development of the world according to Plato. There is no mythological divinity, no muse, no era, no nation, no monster of land or sea, no fable or legend which is not brought before us here in sculptural form. The chief artists were Johann Peter Wagner and Ferdinand Dietz, the former of whom designed the lion bearing the coat-of-arms of the Seinsheim family, the sphinx, and the dragon shown in the engravings on pages 91 and 93. We are indebted to the *Architektur und Kunsthandwerk* for the cuts and particulars.

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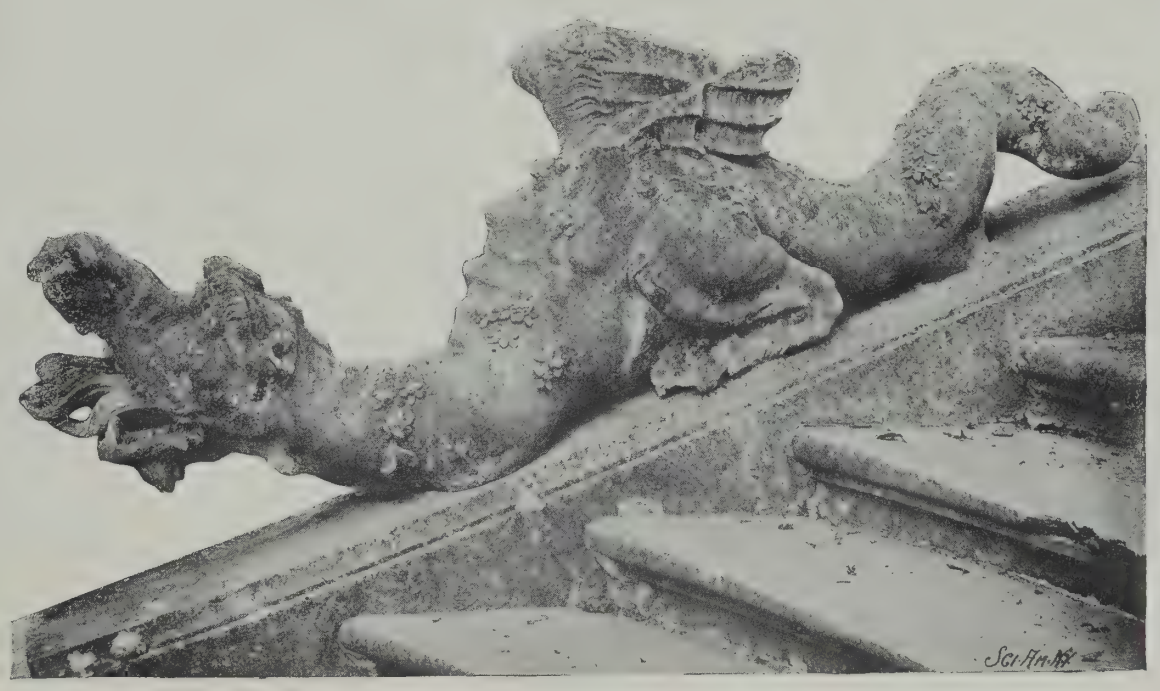
BRANCH OFFICE: 622 F Street, Washington, D. C.

SOME SOUTHERN BUILDINGS.

We present herewith, in this issue, on page 99, some very interesting bits of the old Southern architecture, interesting because it represents a style of architecture successfully used at the early part of the present century. The first illustration (Fig. 1) presents an old building at New Orleans. This old city, or "French town," is divided from the new town by Canal Street. The French town, which is of chief interest to strangers visiting New Orleans, was the part first settled, and it is still almost entirely occupied by the French and Creole inhabitants, French being spoken by them as well as by many of the negroes. The French town is full of quaint and interesting bits of architecture, of which the old tile roof is an example. It stands directly across the street from the archbishop's "palace," formerly a convent: it is very old, and one of the few samples of old Spanish, or "Priest and Nun" tile roof still remaining. The tiles are what are called fantiles, owing to their wavy appearance; the first of the kind were used at Flanders. Further up the street is the old "Mortgage and Conveyance Office" (Fig. 2), in the style of the early part of the century, with its heavy Grecian Doric columns and pilasters at either side of entrance, and supporting the entablature, comprising architrave, frieze, and cornice. The old wrought-iron fence and gate are also of interest. The old State Bank of Louisiana in the next block, and another bank building, with tall Corinthian columns, is now converted into a variety theatre. The illustration (Fig. 3) represents a typical plantation mansion of antebellum days, which is on the plantation of Mistress Granberry, near Columbus, Tenn. The old-time Southern planter, when he builded his house, builded well; and frequently in the Old Colonial style of broad piazzas, with Corinthian columns running through two stories, from the stylobate to the entablature. This style of building one never tires of, and is always glad to see, because it presents a stately and a hospitable atmosphere, which is always welcome at the present time of the conglomerate. Biloxi, Miss., is a Southern seaside resort on the Gulf of Mexico, or rather Davis Bay, and is a typical gulf town, with a succession of piers running out several hundred feet into the bay all along the town front. The principal residence street is immediately along the water, and there are many fine residences. One of the best and most characteristic is shown (Fig. 4) in our illustration. Built only one story high, with a wide-spreading roof on a graceful, sweeping curve, just sufficiently broken by the dormer windows. It is a good example of the Southern resort cottage. The final illustration (Fig. 5) presents the former residence of Jefferson Davis at Beau Voir, which is the next settlement along the coast, west of Biloxi, and takes its name from Jefferson Davis' place. The plantation was formerly owned by one of the governors of Mississippi, who gave it to Mr. Davis when he went into retirement. It is also typical of another style of the old Southern architecture, but is fast going to decay, and is melancholy to contemplate. The place is now in charge of an attendant, who shows the visitors around the garden, now overgrown with weeds and underbrush, and the house deserted and cheerless. The library is a little house a hundred feet away, and here one is shown the desk at which the ex-president of the Confederacy wrote his book, and the spots of ink from his pen still remain upon the floor. The grounds are full of splendid oak trees, hanging heavy with Southern moss, as if weeping at the general desolation.



SCULPTURED DRAGON AT VEITSHÖCHHEIM CASTLE, GERMANY.—See page 92.

A RESIDENCE AT FORREST HILL, N. J.

We present herewith in this issue, on page 105, a residence recently completed for James M. Hunt, Esq., at Hiller Parkway, Forrest Hill, Newark, N. J. The engravings shown herewith illustrate a design treated in the half timber and stone style. It has many good features, and is a most excellent example for a modern home. The underpinning, part of first story, and tower are built of Georgia marble, of a pinkish white color. The faces are left rough as they come from the quarry, while the inside faces at window jambs and arches are dressed. The front porch floor is laid with mosaic tiles. Roof is covered with sea green slates. Dimensions: Front, 41 ft. 6 in.; side, 51 ft. 6 in., not including porch. Height of ceilings: Cellar, 7 ft. 6 in.; first story, 9 ft. 9 in.; second, 9 ft. 2 in.; third, 8 ft. 6 in. Vestibule has a mosaic floor, and a wainscoting of pink Georgia marble, finely shaded. The main hall is one of the most artistic apartments. It is trimmed with quartered oak, and is furnished with a paneled wainscoting, seat, ceiling beams, and an ornamental staircase, with newel posts extending to ceiling, and supporting an arch, with transom, filled in with spindlework. The nook, under staircase, is provided with Tennessee marble steps, mosaic floor, paneled divan, and an open fireplace, with tiled facings extending to ceilings, and wrought iron trimmings. The whole is lighted with stained glass effects. The fireplace in hall is built of brick, with facings and mantel of similar brick, while the hearth and floor in hall are laid with tiled mosaic. The other floors are of parquet, except the floors on second story, which are laid with yellow pine. Drawing-room is treated with white and gold in a dainty manner. It has a hand-painted frieze, on a bluish-gray background. The remaining wall space is of a similar shade to harmonize. The fireplace in this room is furnished with a tiled hearth, Mexican onyx facings, and a mantel of exquisite design, with rare bits of carving, beveled plate mirror, and brass trimmings. Library, den and dining-room are trimmed with oak. The former is provided with bookcases, built in, and a fireplace, with grate, tiled trimmings, and a carved mantel, with columns. Den is fitted up with a closet, with stationary bowl, and a door opening out upon porch. Dining-room has a paneled wainscoting, ceiling beams, wood cornice, and a fireplace treated in the old Dutch style, with carved headpiece, facings and hearth, laid with unglazed tiles. This fireplace has a very fine wrought iron fire basket and rack, of unusual beauty in detail. Butler's pantry is fitted up with the best conveniences. Kitchen has a wainscoting of Italian marble, and a floor laid with scrap mosaic. The fireplace for range is built of white glazed tiles. The nook, back and table are built in of iron and slate. Pantry is well fitted up. Rear stairs are conveniently located. The second floor contains a large, open hall, trimmed with oak, sewing-room, three bedrooms, linen closet, and bathrooms, trimmed with whitewood, and finished natural. Bathroom is wainscoted, and paved with white English tiling, and is fitted up with the best porcelain fixtures, and exposed plumbing. The third floor contains three bedrooms and trunk-room. Cemented cellar contains furnace, laundry, servants' bath, and other necessary apartments. Mr. James H. Lindsley, architect, Broad Street, Newark, N. J.

Our engraving was made direct from a photograph of the building, taken specially for the SCIENTIFIC AMERICAN.

A RESIDENCE AT JAMAICA, LONG ISLAND.

The engraving shown on page 104 presents a very handsome residence, which has been erected for Asher Wright, Esq., at Jamaica, Long Island. It has many good features, and floor plans that are arranged and finished in a most complete manner, and is constructed of the best materials in a thorough, workmanlike manner. The building is treated in the colonial style. The underpinning is built of brick laid up in red mortar. The first story and attic are clapboarded and painted colonial yellow, with ivory-white trimmings; second story is shingled and left to finish natural. Blinds are painted bronze-green. Roof shingled and finished natural. Dimensions: Front, 35 ft.; side, 48 ft., including porch and veranda. Height of ceilings: Cellar, 7 ft.; first story, 9 ft. 6 in.; second, 9 ft.; third, 8 ft. 6 in. The reception hall, trimmed with oak, contains an ornamental staircase, with columns extending to ceiling, with the space between filled in with spindle balusters, two paneled seats, and also two leaded windows, glazed with delicate-tinted glass. The walls are tinted a terracotta color. The parlor is trimmed with pine, and is treated with white enamel and gold, and contains an open fireplace, fitted up with tiled hearth and facings, and a handsome colonial mantel. The walls are tinted in delicate shades of green and chocolate, with decorated ceilings. The dining-room has a southern exposure, and has five large windows and a door opening upon porch, two large closets, and is finished in pine and grained quartered oak. Butler's pantry, kitchen and laundry are finished in Georgia pine and wainscoted with same; it is finished natural and varnished with spar varnish. These apartments are furnished with the best modern conveniences. Second floor contains four bedrooms, closets and bathroom; the latter wainscoted and fitted up with the usual fixtures and exposed plumbing. The walls are tinted salmon color, and the woodwork is painted in tints of green. The third floor is left open; several rooms could be finished off if desired. Cemented cellar contains furnace and other necessary apartments. Hot and cold water throughout; steam heat, first-class plumbing, gas fixtures, and everything required to furnish up a comfortable and convenient house. Cost, $4,000, complete. Messrs. Harmer & Hardenbrook, architects, No. 72 Fulton Street, Jamaica, Long Island.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

A RESIDENCE AT BUENA PARK, CHICAGO, ILL.

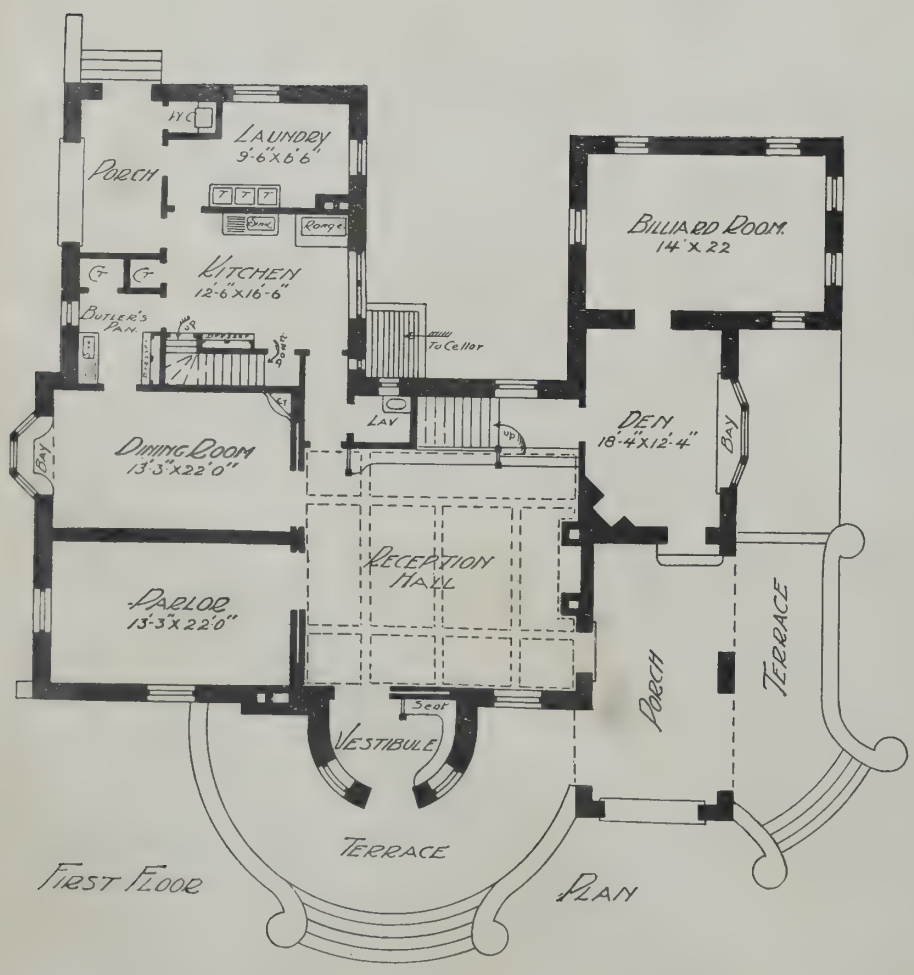
We present herewith in this issue, on page 100, a residence recently erected for E. E. Freeman, Esq., at Buena Park, Chicago, Illinois. The engraving shows a colonial dwelling, with square lines, and ornamented sufficiently to give it a pleasing appearance, while the plans show a good interior arrangement which is well fitted up and finished complete. The underpinning is built of rock-faced stone, laid up at random. The exterior framework is sheathed, and then clapboarded and painted white. The roof is shingled and stained moss green. Dimensions: Front, 31 ft. 6 in.; side, 42 ft. 6 in., not including piazza. Height of ceiling: Cellar, 7 ft.; first story, 10 ft.; second, 9 ft.; third, 8 ft. 6 in. The interior throughout is trimmed with sycamore. Vestibule is paneled, and the floor is paved with tiles. Hall has a paneled wainscot and an ornamental staircase turned out of oak, with broad landing, low treads, and carved newels. It is lighted effectively by stained glass windows. Parlor and dining-room are separated by sliding doors, and each have open fireplaces, trimmed with tiles and furnished with hardwood mantels of excellent design. Kitchen and pantries are trimmed and wainscoted with narrow beaded stuff, and are furnished with the usual fixtures. The second floor contains four bedrooms, seven closets and bath; the latter is wainscoted and provided with the usual fixtures and exposed plumbing. There are three bedrooms and ample storage on third floor. Cemented cellar under whole of building contains laundry, furnace and other apartments. Cost, $5,000, complete. Mr. Gamble Rogers, architect, Chicago, Ill.

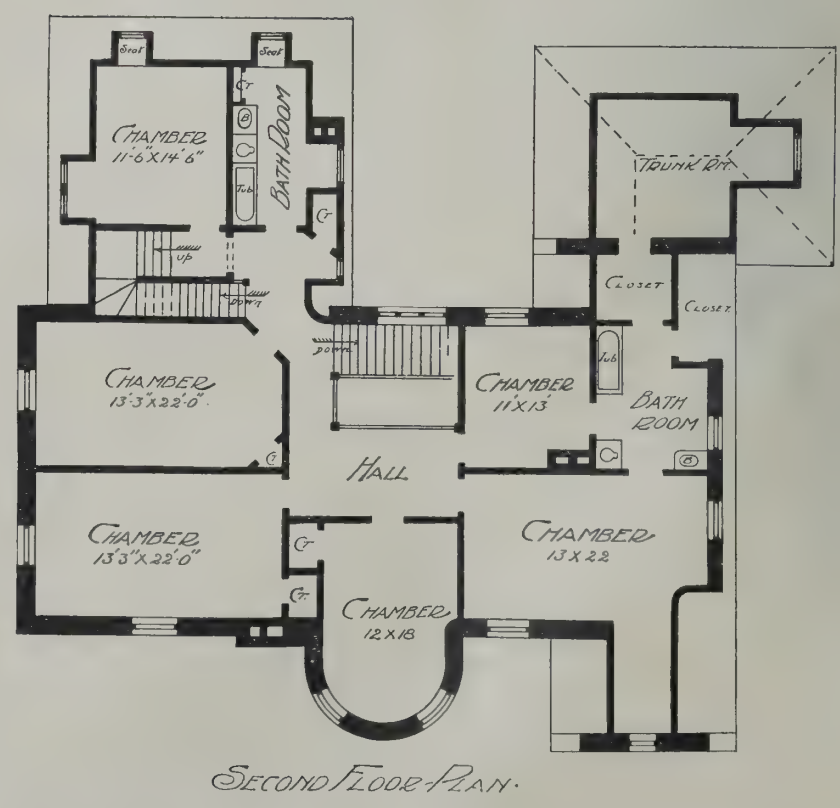
Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

A COTTAGE AT LESTERSHIRE, N. Y.

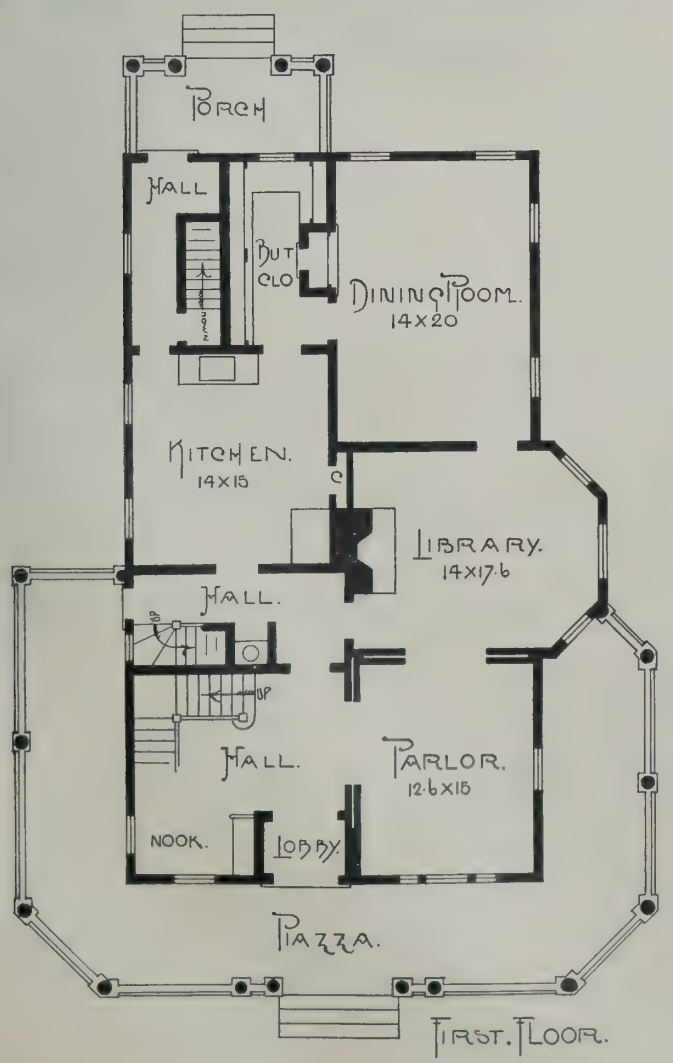
We present herewith on page 101 a cottage recently completed for Mr. E. Tilleson, at Lestershire, N. Y. The combination of good features is most complete. It is a difficult matter to secure a design with attractive and pleasing elevations and well-arranged plans, and at a low cost. The building is provided with a substantial foundation and underpinning, built of local stone in a neat manner. The exterior is clapboarded and painted an olive yellow, with white trimmings. The roof is shingled and finished natural. Dimensions: Front, 29 ft.; side, 33 ft. 6 in., not including piazza. Height of ceilings: Cellar, 7 ft.; first story, 9 ft.; second, 8 ft.; third, 8 ft. The interior throughout is trimmed with pine, and treated in colors. The doors and windows have neat casings. The hall is attractive, and contains an ornamental staircase. The parlor and dining-room are separated by archways, and the former is provided with a mantel. Dining-room contains an octagonal projection, and a china closet built in. Kitchen and pantries are wainscoted with narrow-beaded stuff, and are fitted up complete. Butler's closet contains sink, closets, and cupboards. Second floor contains den, three bedrooms, and good closets. Den can be utilized for a bathroom at one's desire. Third floor contains ample storage. Cellar contains all necessary apartments. Cost, $1,000, complete. Mr. E. Tilleson was the architect and builder.

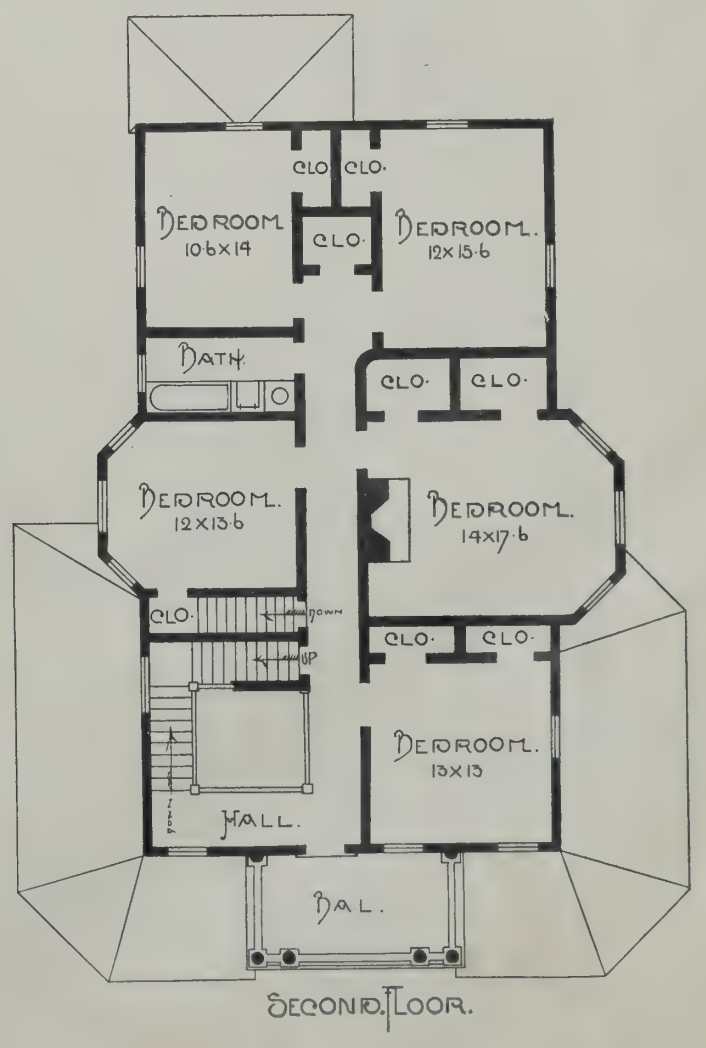
Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.



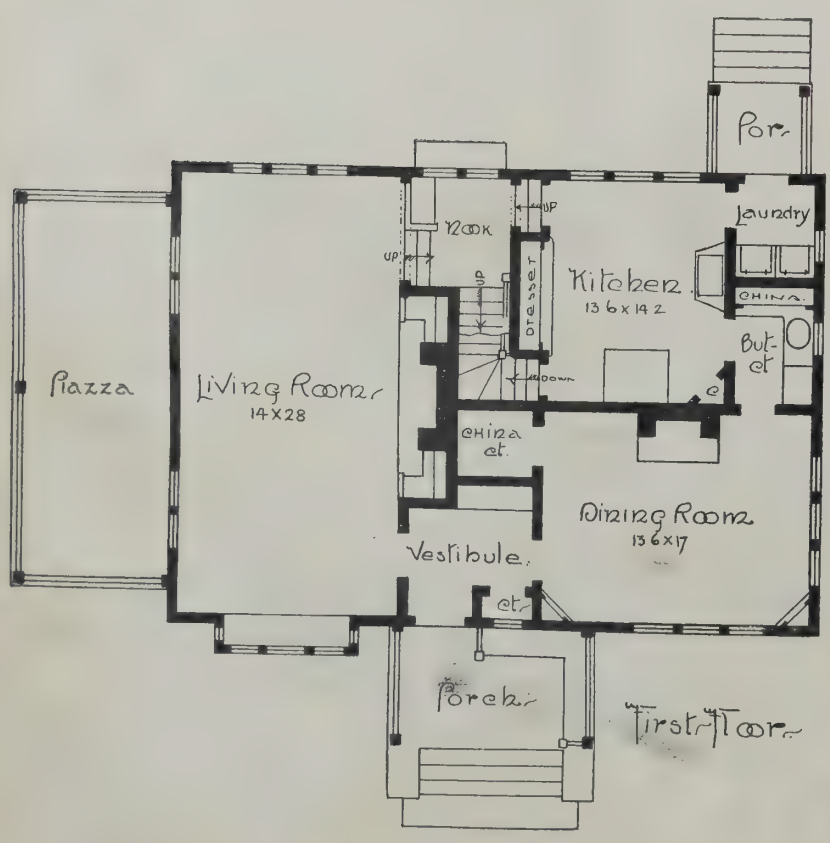


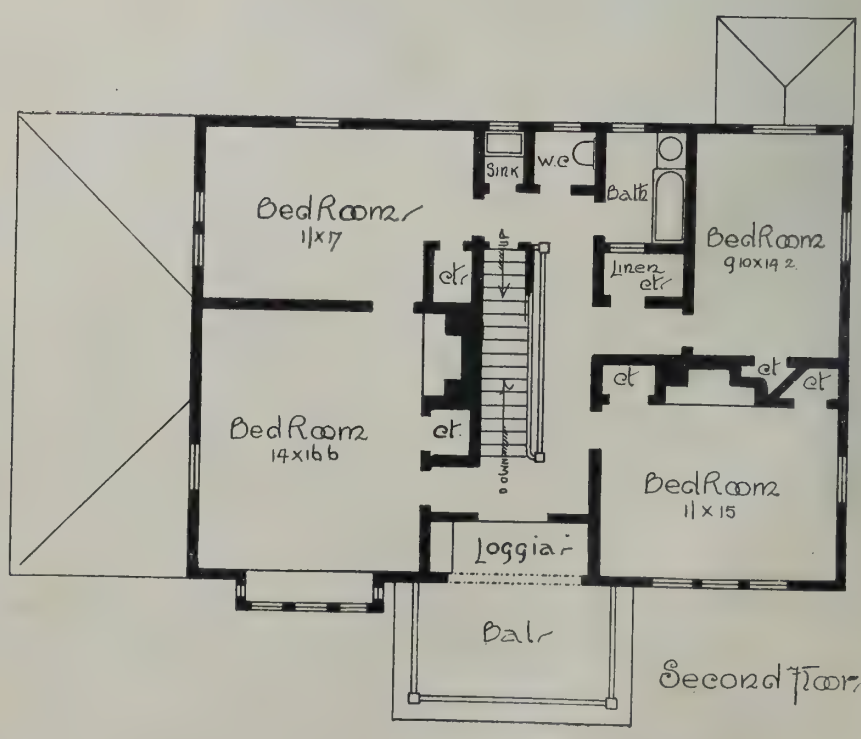
SEMI-COLONIAL RESIDENCE AT OVERBROOK, PA.—See page 106.





A RESIDENCE AT SPRINGFIELD, MASS.—See page 106.





A MODEL DWELLING AT LARCHMONT, N. Y.—See page 106.

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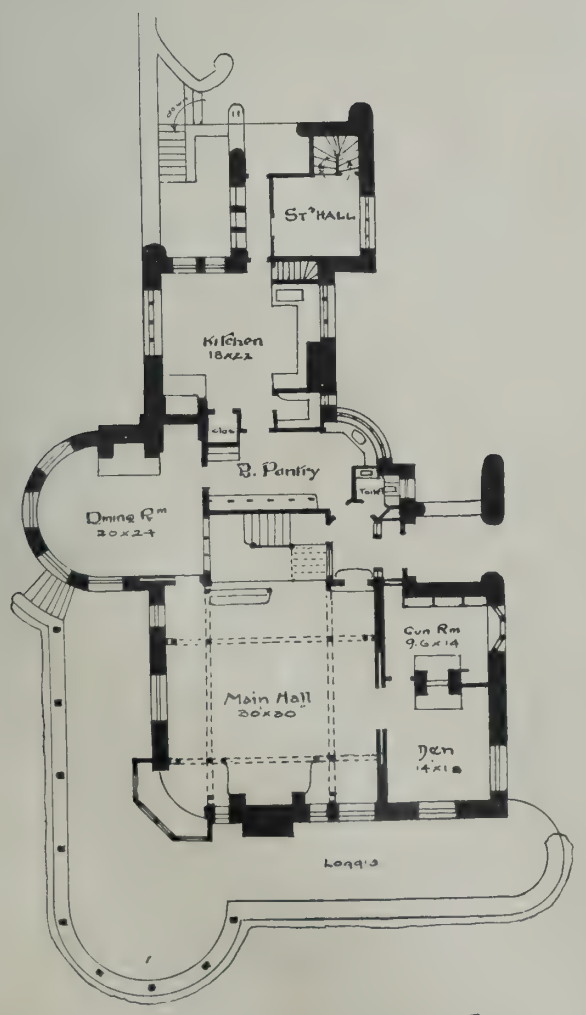
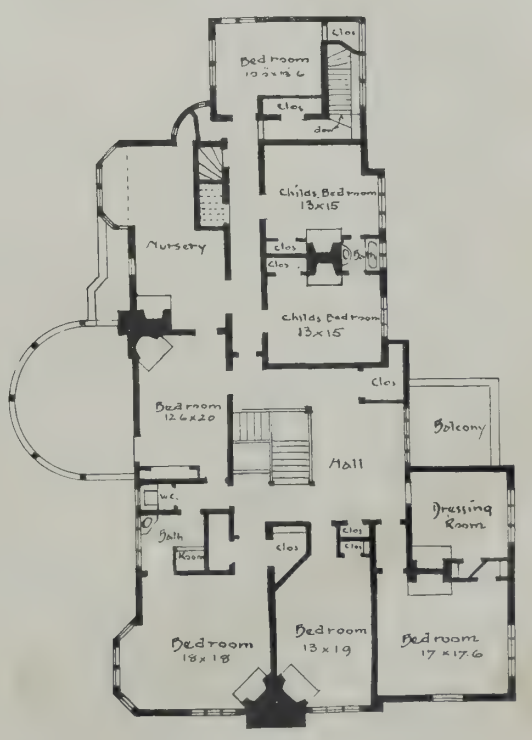
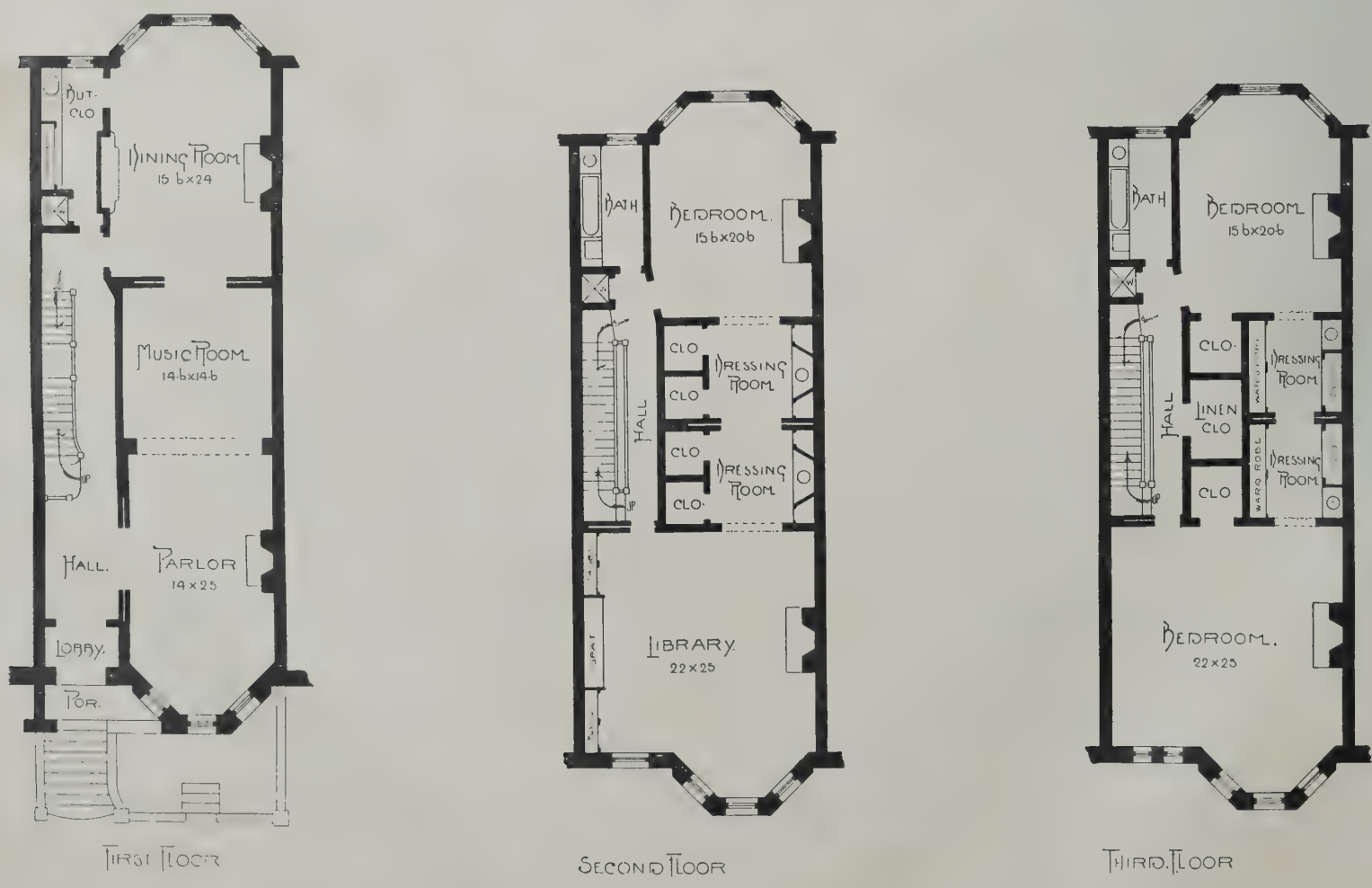


First Floor Plan



Second Floor Plan

A RESIDENCE AT TUXEDO PARK, N. Y.—See page 106.



A TOWN RESIDENCE IN NEW YORK CITY, N. Y.—See page 92.

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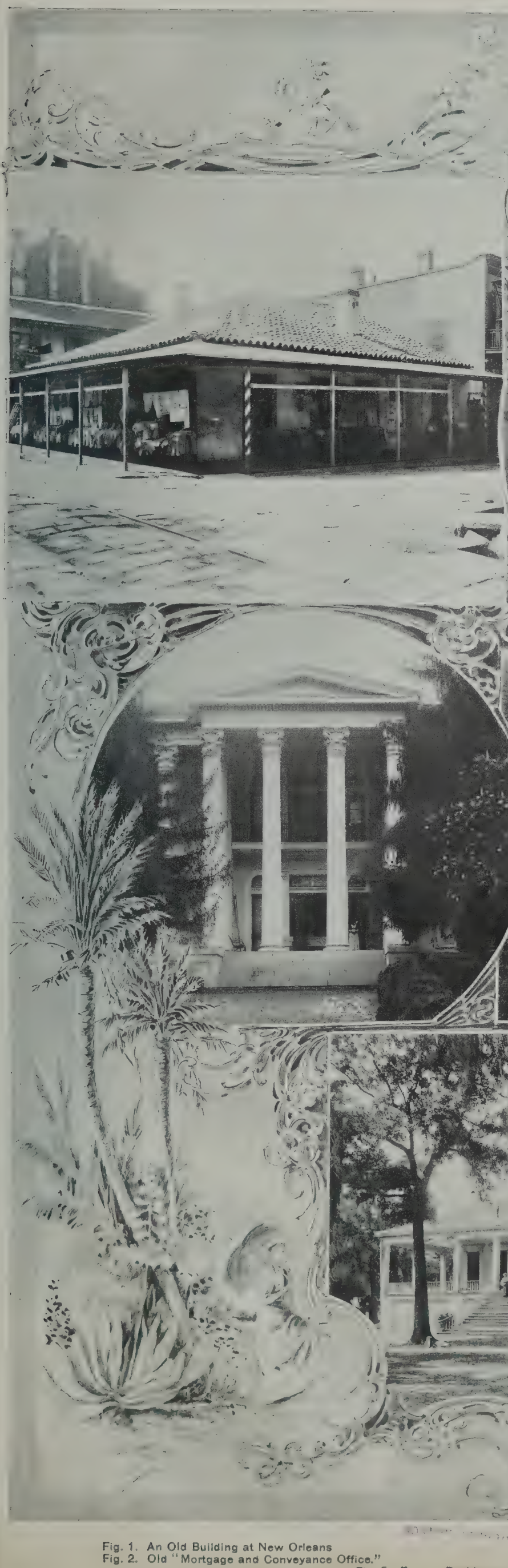
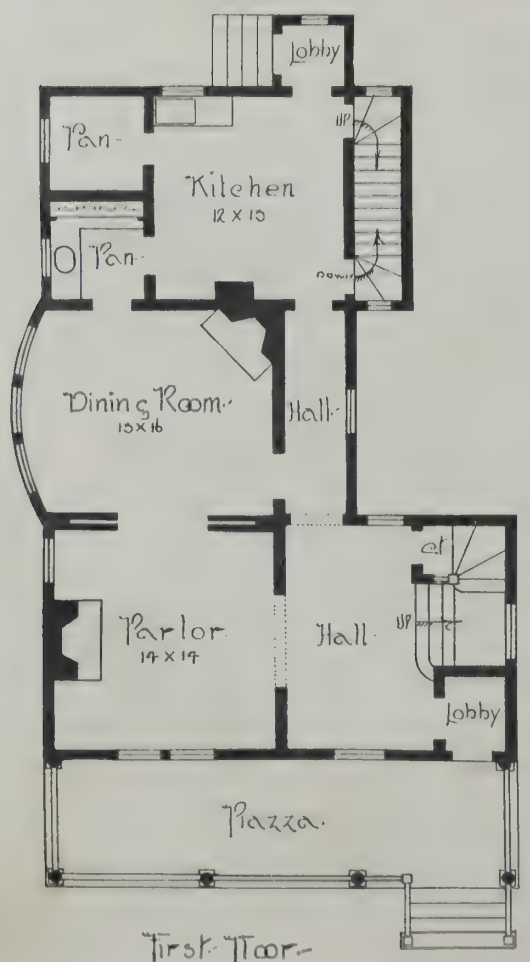
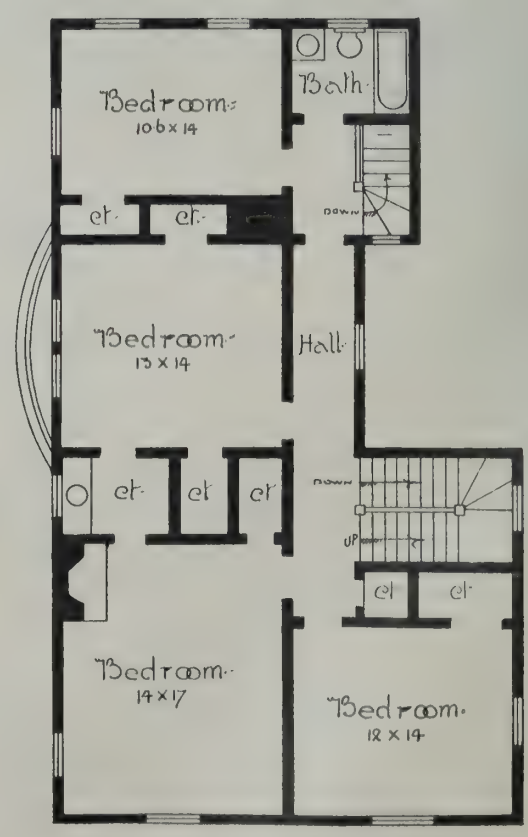
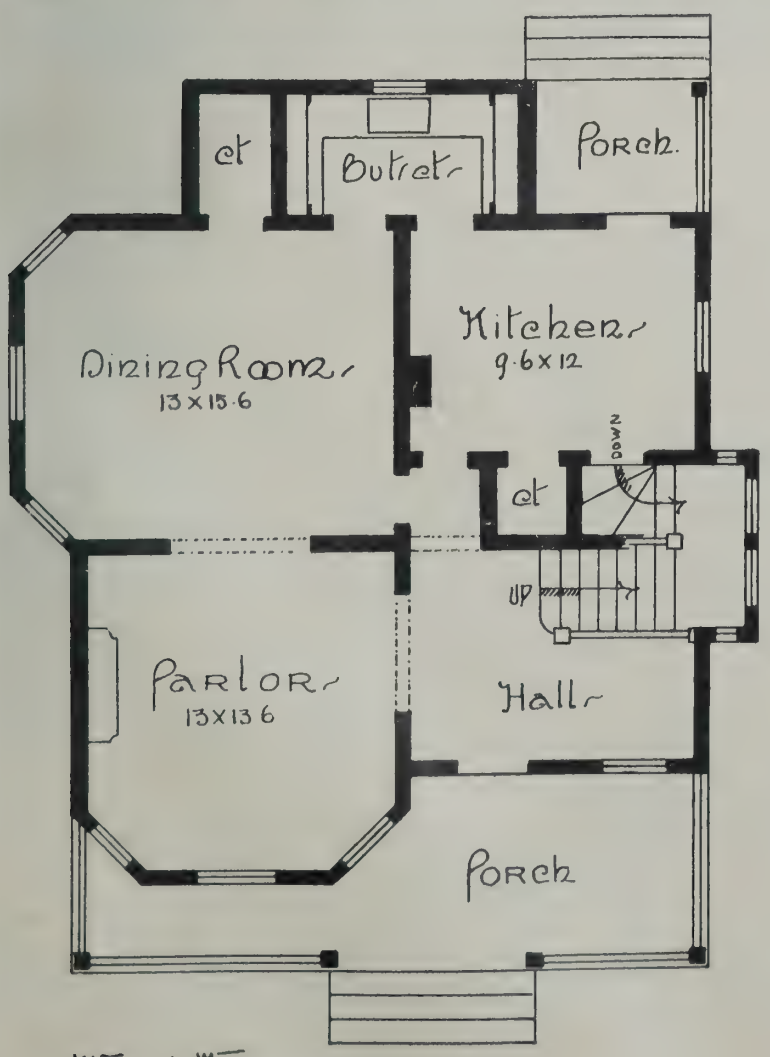


Fig. 1. An Old Building at New Orleans
Fig. 2. Old "Mortgage and Conveyance Office."
Fig. 3. Typical Plantation Mansion of Antebellum Days.
Fig. 4. A Southern Resort Cottage.
Fig. 5. Former Residence of Jefferson Davis at Beau Voir.

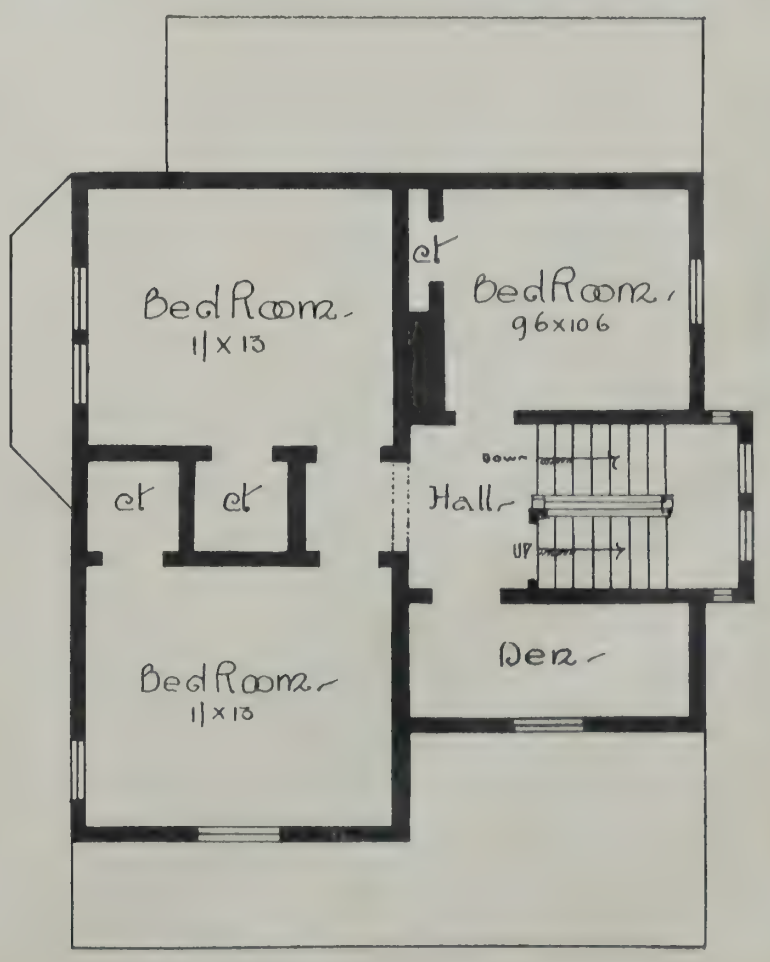




A RESIDENCE AT BUENA PARK, CHICAGO, ILL.—See page 93.

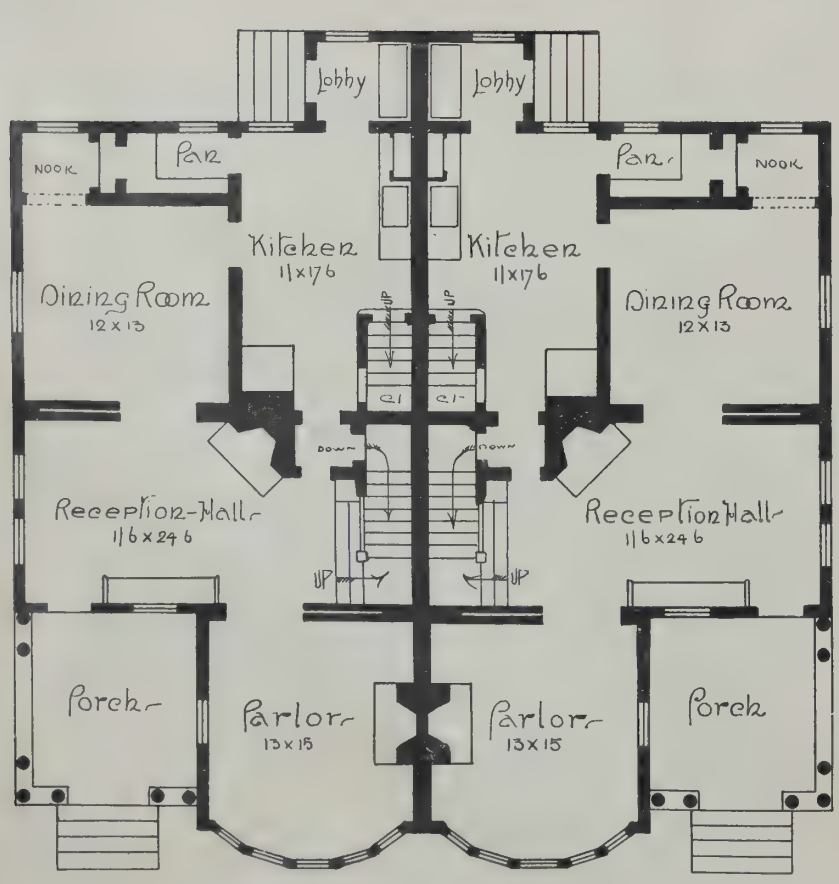


First Floor.

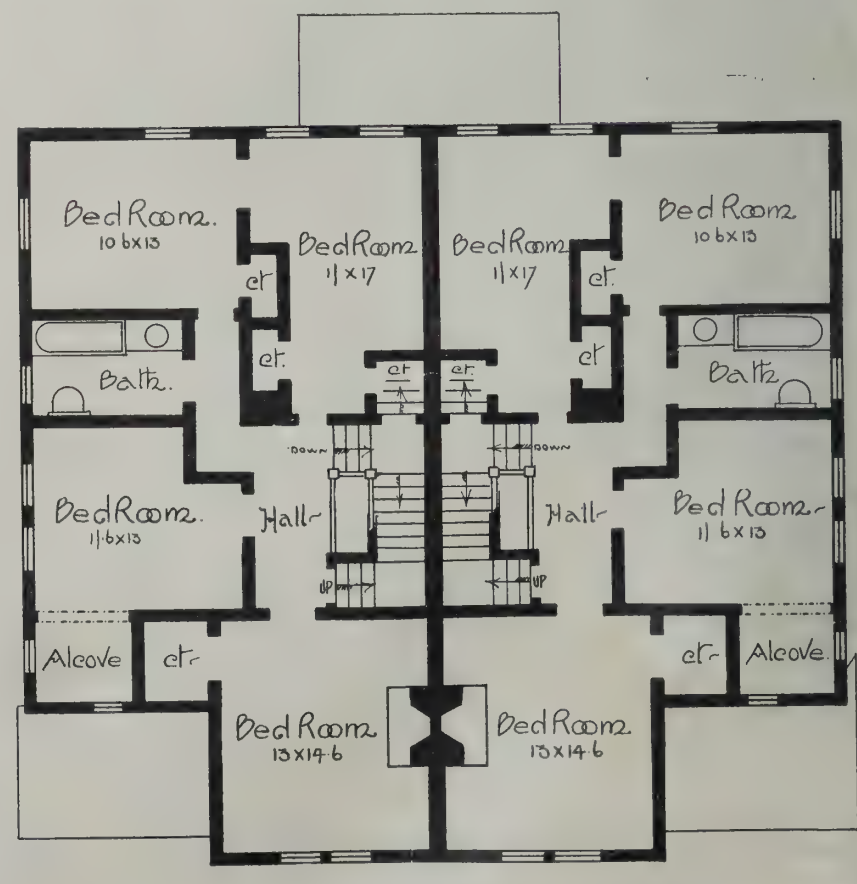


Second Floor.

A COTTAGE AT LESTERSHIRE, N. Y.—See page 93.



First Floor.



Second Floor.

A DOUBLE DWELLING HOUSE AT DEERING, ME.—See page 106.

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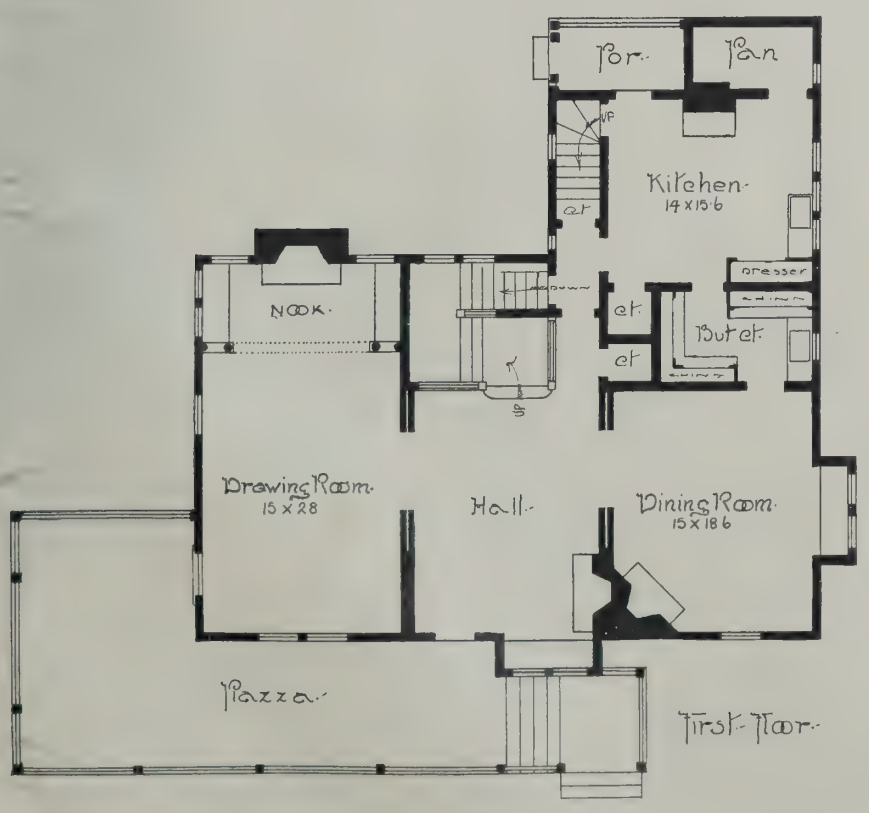
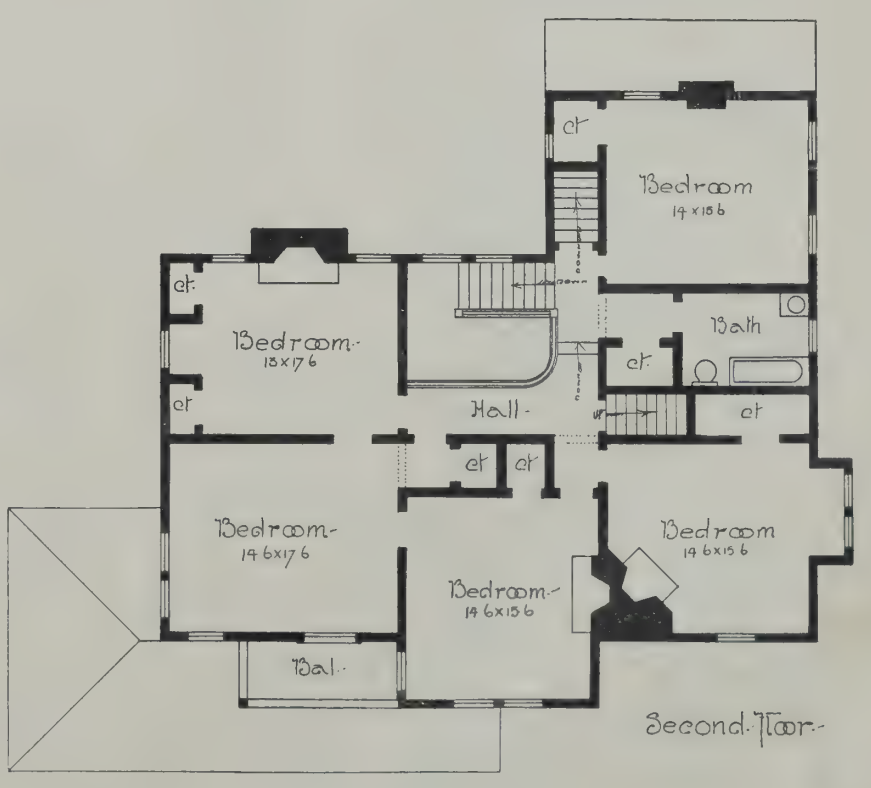
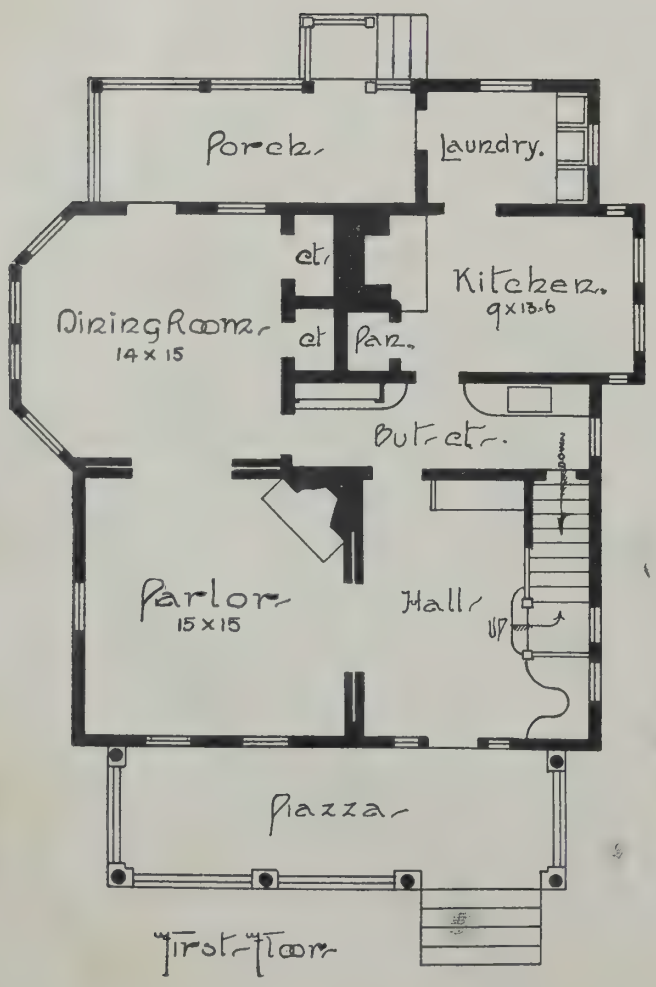
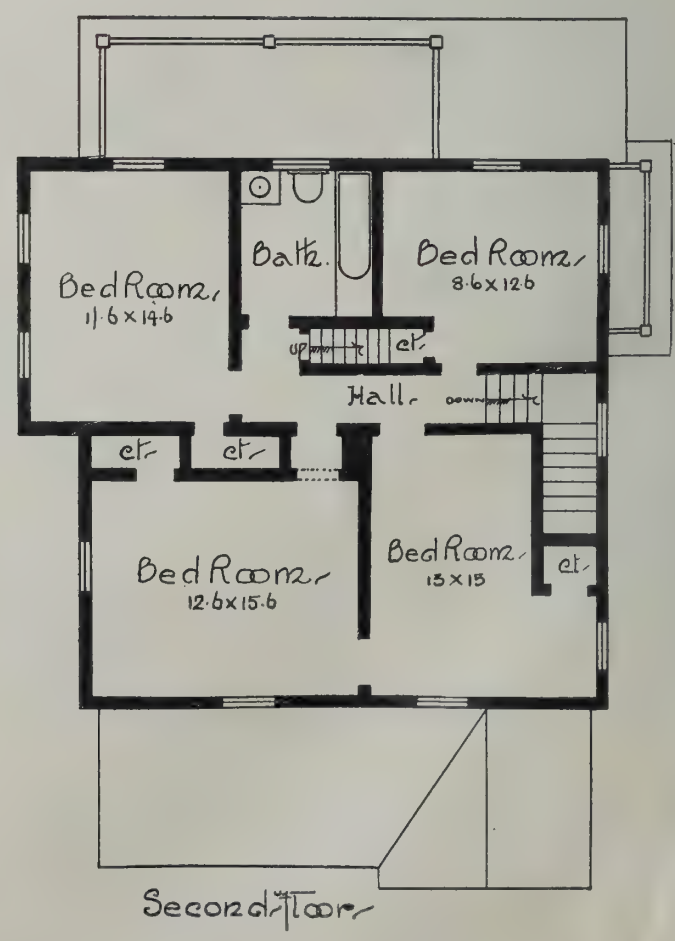




A DWELLING AT LAWRENCE PARK, BRONXVILLE, N. Y.—See page 106.





A RESIDENCE AT JAMAICA, LONG ISLAND.—See page 93.

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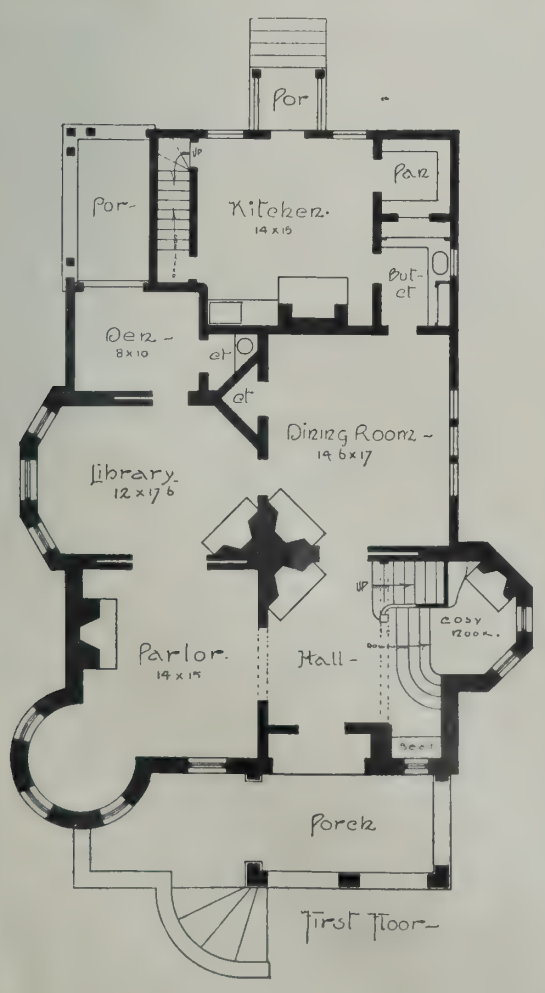
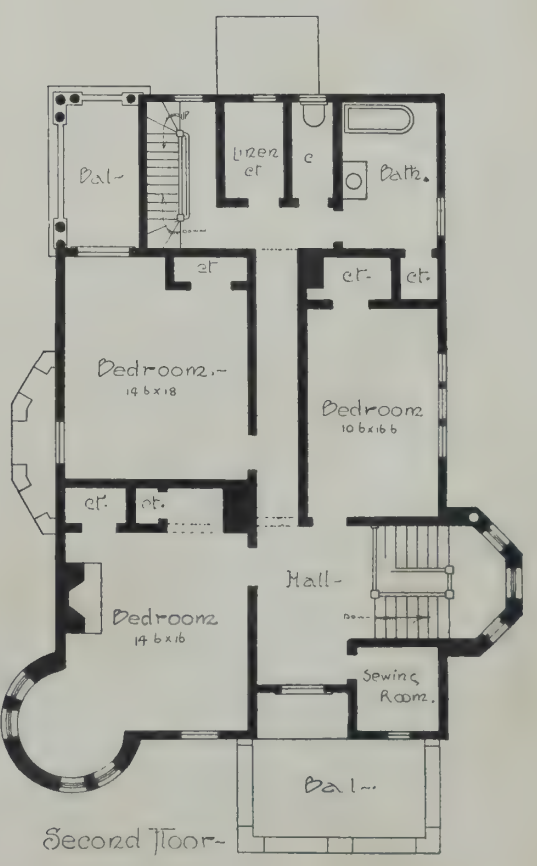




A RESIDENCE AT FORREST HILL, N. J.—See page 93.

A DOUBLE DWELLING HOUSE.

The accompanying illustrations, on page 102, present views of the exterior, interior, and floor plans of a double dwelling house, which has been erected for Mr. George T. Edwards and Mr. Charles E. Miller, at Deering, Me. The elevations show a dwelling executed in the modern style, with colonial detail. The plans show the porches placed at either end of building, providing side entrances, thereby adding a new feature, and departing from the usual scheme of having the entrances at front with adjoining piazzas. The underpinning is built of brick laid up in white mortar. The exterior framework is sheathed, clapboarded, and painted light cream, with light olive green trimmings. The blinds are painted bottle green, and the roof is shingled and painted a reddish brown. Dimensions: Front, 51 ft.; side, 45 ft., not including porches. Height of ceilings: Cellar, 7 ft.; first story, 9 ft. 6 in.; second, 9 ft.; third, 8 ft. 6 in. The reception halls are the principal features on the first floor. They are trimmed with cypress and finished natural. These apartments are connected to parlors and dining-rooms by sliding doors, allowing the three rooms to be thrown into one apartment when desired. A good sized fireplace with brick facings and hearth, and a mantel of colonial design with columns and mirror, add much to the beauty of each hall, while the staircases with fluted newel posts extending to ceilings form a unique background for same. The large ornamental windows, overlooking the piazzas, are glazed with stained glass of rose tints. The parlors are trimmed with white pine and treated with ivory white and gold; they are provided with open fireplaces furnished with cream white tiles and mantels of good design; and also bay windows in five sections which form a graceful sweep for one end of the rooms. The dining-rooms are trimmed with cypress, and are fitted up with serving closets connected with pantries. The kitchens, pantries and the remaining apartments are trimmed with whitewood and finished natural; the former are wainscoted and fitted up with the usual fixtures. Halls, dining rooms, kitchens and bathroom have hardwood floors. The second floor, of each house, contains four bedrooms, closets and bathrooms; the bedroom, over parlor, is treated in ivory white and is provided with an open fireplace with tiled trimmings and mantel. Bath-room is wainscoted and fitted up replete. Third floor of each house contains one bedroom and ample storage. Cemented cellars contain furnace, laundry and other necessary apartments. Cost, including plumbing, heating, painting and papering, $4,500. The elevations were designed by Mr. F. A. Thompson, architect, Portland, Me., and the plans and suggestions taken from the Scientific American by the proprietor.

Our engravings were made direct from photographs of the building, taken specially for the Scientific American.

A DWELLING AT LAWRENCE PARK, BRONXVILLE, N. Y.

On the accompanying page 103 will be found illustrations showing a half timbered house, of the English style, which has been recently completed for W. A. Jackson at Lawrence Park, Bronxville, N. Y. The elevations are attractive and the plans excellent. The underpinning and all stone-work, where shown, are built of local rockfaced stone laid up at random in a rough manner. The building is beamed, forming panels, which are filled in with plaster work and left in its natural gray color. The trimmings are painted a dark Indian red. The roof is covered with white pine shingles and left to finish natural. Dimensions: Front, 50 ft.; side, 50 ft., exclusive of piazza. Height of ceilings: Cellar, 8 ft.; first story, 10 ft.; second, 9 ft.; third, 8 ft. The interior throughout is trimmed with whitewood. The broad hall and dining-room have beamed ceilings and open fireplaces, trimmed with tiled hearths and facings and hardwood mantels. The staircase is an ornamental one with carved newel posts, rail and balusters. The drawing-room is furnished with a low archway, forming a nook with paneled seats and an open fireplace. The floors are laid with yellow pine and highly polished. The kitchen and pantries are wainscoted with narrow beaded stuff, and each is fitted up in the best possible manner with the usual fixtures. Second floor contains five bedrooms, seven large closets and bathroom, the latter wainscoted and fitted up replete. Three bedrooms and trunk-room on third floor. Cemented cellar contains furnace, laundry and other necessary apartments. Mr. William A. Bates, architect, 149 Broadway, New York.

Our engravings were made direct from photographs of the building, taken specially for the Scientific American.

A RESIDENCE AT TUXEDO PARK, N. Y.

We present herewith, on page 97, a residence recently completed for James Lawrence Breese, Esq., at Tuxedo Park, N. Y. The building is situated upon a most charming site, a rising slope providing a commanding vista of the surrounding country. The style adopted is the half rough stone and timber order, and is in keeping with the surroundings, for nature has done much for Tuxedo in giving it a wooded, rocky and rugged appearance. The first story is built of field stone laid up at random; the boulders, being selected, are massive in size and moss-grown; the second and third stories are beamed, forming panels, which are filled in with stucco work. The chimneys are picturesque, and the side chimney is of field stone up to the height of second story, where it is a combination of stone and brick. The piazza is very extensive, running out into a loggia at one end. The roof is shingled. The interior is handsomely and tastefully finished in hardwoods. The rooms are conveniently arranged for a country house. The main hall answers as a living room, is thirty feet square, and is provided with a beamed ceiling laid out in panels. It contains many good features, including pleasant nook, panel seat, a large open fireplace, and a grand staircase, which runs from the centre of hall, and has an arched platform with excellent effect. The gun-room, at the left of entrance, is provided with gun racks, closets, and all the necessary fixtures suitable for a sportsman's room; adjoining is the den, which is fitted up with fireplace complete. The dining-room, circular at one end, contains a paneled wainscoting and ceiling beams. The fireplace is very handsomely fitted up. Butler's pantry is fitted up in a style becoming a well appointed house. Kitchen and servants' dining hall have wainscoting and the best modern fixtures complete. The second floor contains five bedrooms, two children's bedrooms, one maid's bedroom, dressing-room and bathroom; there is an extra bathroom between the two children's rooms. This floor is well provided with closets, there being fourteen in number. Third floor contains the servant quarters and ample storage. Cemented cellar contains the laundry, furnace, and other apartments. Cost, $20,000, complete. Mr. R. H. Robertson, architect, Fifth Avenue, New York.

Our engraving was made direct from a photograph of the building, taken specially for the Scientific American.

A RESIDENCE AT SPRINGFIELD, MASS.

One of the engravings presented in this issue, on page 95, illustrates the residence recently erected for Dr. Philip Stafford Moxon, at Springfield, Mass. The perspectives show a good substantial dwelling, colonial in treatment, and well ornamented, and the plans present an excellent interior arrangement, with large rooms and handsomely finished. The underpinning is built of local red brick, with red mortar. The first story is clapboards, and the second and third stories are shingled. It is painted a yellowish-brown color, with cream white trimmings. Roof is shingled and painted red. Dimensions: Front, 34 ft.; side, 51 ft. 6 in., exclusive of piazza and porch. Height of ceilings: Cellar, 7 ft.; first story, 10 ft.; second, 9 ft.; third, 8 ft. 6 in. Hall is trimmed with antique oak. It has a paneled wainscoting and a ceiling heavily beamed. The vestibule is paneled, and it is furnished with a tiled floor, and the nook is provided with a paneled divan. The staircase is turned out of similar wood, with carved newels. Parlor and library are trimmed with cherry, and are separated by double sliding doors. The fireplace in library is furnished with tiled trimmings, and a carved mantel, with columns and mirror. Dining-room is trimmed with oak, and it contains a paneled wainscoting, ceiling beams, hardwood floor, and a china cabinet. Pantries, rear hall and kitchen are trimmed and wainscoted with yellow pine, finished natural. These apartments are provided with all the necessary fixtures. Rear hall, or lobby, is provided with stairs to cellar, and nook for ice box. Side entrance and staircase hall to second floor is conveniently located, and it is provided with a stationary bowl. The second floor is trimmed with ash. It contains five bedrooms, eight closets and bathroom, while the third floor contains four bedrooms and trunk-room. Bathroom is wainscoted and furnished with the usual fixtures. Cemented cellar contains furnace, laundry and other apartments. Cost, $6,000, complete. J. D. and W. H. McKnight, architects, 137 State Street, Springfield, Mass.

Our engravings were made direct from photographs of the building, taken specially for the Scientific American.

A MODEL DWELLING AT LARCHMONT, N. Y.

On page 96 will be found engravings illustrating a model dwelling recently erected for Joseph B. Gilder, at Larchmont, N. Y. The design is rendered in a most artistic manner, and is provided with a spacious piazza, a porch at front, latticed window effect, and a graceful sloping roof with dormers. The underpinning is built of rockfaced field stone laid up at random. The exterior framework is sheathed, papered, and then covered with shingles and left to finish a natural silver-gray color, while the trimmings are painted white. The roof is shingled and finished similar. Dimensions: Front, 41 ft; side, 31 ft., not including piazza. Height of ceilings: Cellar, 7 ft.; first story, 9 ft. 6 in.; second, 9 ft.; third, 8 ft. 6 in. The interior throughout is trimmed with white pine and treated in the colonial style. The entrance hall is a large vestibule provided with a hat closet, paneled divan and wainscoting, and openings into living and dining room. The living room is spacious and one of the principal apartments. It has a plaster wainscot, and the walls above, and throughout the building, are rough plastered sand finish, and then treated in colors. A novel feature in living room is the nook, fireplace and staircase, from special design. The fireplace is built of Tiffany brick, with hearth and facings of same, and is provided with a colonial mantel. There are bookcases built in on either side, and paneled seats at end of nook. A grille screen separates the staircase from living room proper, and two steps lead to nook, which is provided with latticed windows, opening on to the flower boxes, and a paneled divan. The windows opening on to piazza run to floor. Dining-room is provided with a cluster of windows at side and end. The fireplace is built of Tiffany brick, with hearth and facings of same. The china cabinets in either corner have leaded glass doors. The butler's pantry is furnished with dressers and the usual fixtures. Kitchen and laundry are wainscoted and provided with the best modern conveniences, respectively. Second floor contains a loggia, four bedrooms, closets and bathroom. The bedrooms are treated in an attractive manner, and the two front rooms have open fireplaces. The bathroom is wainscoted and fitted up with porcelain fixtures and exposed plumbing. Third floor contains three bedrooms. Cemented cellar contains furnace and other necessary apartments. Cost, $6,000, complete. Mr. A. L. C. Marsh, of Marsh, Israels & Harder, No. 194 Broadway, New York, was the architect.

Our engravings were made direct from photographs of the building, taken specially for the Scientific American.

SEMI-COLONIAL RESIDENCE.

Our engravings on page 94 illustrate a very cleverly executed design by Architect Horace Trombour, 310 Chestnut Street, Philadelphia, owned by Walter B. Smith, and is located at corner of Drexel Road and Fifty-ninth Street, Overbrook, Pa. The exterior presents a harmonious combination of stone, brick and terracotta, the two latter being in the front pediment, and of buff color; while the general stonework is gray, trimmed with cut limestone, with delicate detail its appearance is of breadth, and in accordance with its surroundings. The general dimensions of main structure are: Front, 55 ft. 6 in.; side, 56 ft. 10 in. The reception hall, which is entered from either circular terrace or side porch, is unusually large and finished in oak, with paneled ceiling corresponding to finish of broad staircase, and cheerful open fireplace at the side. At the side of staircase is a long oaken seat, and under is a well-lighted lavatory. Dining room and parlor are of equal size and access to the hall. Dining room has china closet, and sunny bay with seat in it. Kitchen and butler's pantry replete with culinary fixtures, with laundry adjoining. Cellar and back staircase direct from kitchen. Den is secluded and cozily arranged. In the second story there are five large chambers and two bathrooms, one of which connects with front chamber, all rooms having convenient closets. Both the first and second stories are finished in oak. A broad back staircase leads to the attic, which is finished in pine, and contains two chambers, a servant's bedroom, and bathroom, and ample trunk and storage room.

Flat Slate Roofs.

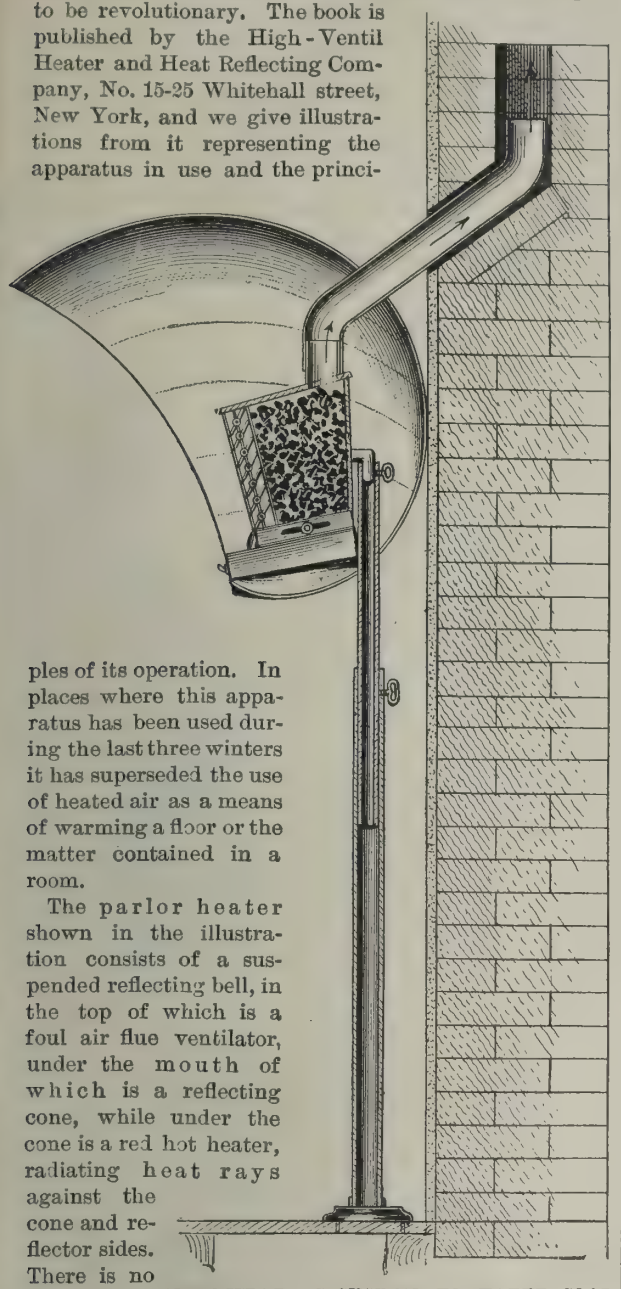
Builders and roofers generally regard slate as adapted only for roofs having a high degree of pitch, and that sheet metal is the proper material for all classes of roofs of low pitch, or entirely flat. This opinion is based on the past experience in roofing, but has no foundation in fact. A flat roof may be constructed of slate, having all the advantages of any other slate roof. The slate, instead of being split into thin slabs and cut in various sizes of ordinary roofing slate, is sawed into large blocks of any convenient size, with square corners and straight edges, and split into slabs varying in thickness from one-half to two inches, according to the strength of roof required. The edges of these slabs are carefully smoothed and jointed, so as to fit closely, and placed side by side, so as to form a plain, smooth surface, instead of lapping. The joints or edges are laid in a cement which unites the piece and renders them watertight. The slabs are kept in position by their own weight, or may be fastened to their supports by galvanized iron or copper bolts or screws.—*Illustrated Carpenter and Builder.*

Development of Decoration.

The Egyptian decorator was a priest or a priest's servant, and his business became hereditary. The Indian decorator was a servant of the family, and his situation also frequently descended to his son. In China and Japan the decorators were in the earlier times priests working from a religious motive. With the Greeks, too, religion fostered the arts; so in the medieval ages. It was not till Renaissance, when the invention of printing led to the spread of knowledge, that individual excellences brought the individual out from obscurity, and we have styles of decoration as diversified as the people who produced them. In Japan the decorator originally worked with the utmost patience and loving care to illustrate his religion; thus decoration came to be practiced by princes and persons belonging to great families. At last it came down to the art workman, who, in Japan, with no competition or machinery, and but few wants, made everything he produced instinct with beauty.—*Decorator's Gazette.*

RADICAL IMPROVEMENTS IN HEATING AND VENTILATING APPARATUS.

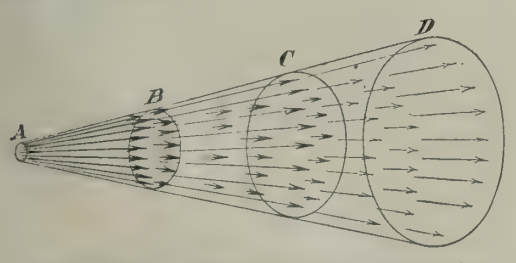
A handsomely illustrated, recently published little book of sixty pages describes the application of new means of ventilating and heating houses, the devices being separately simple enough, but in their combination designed to be revolutionary. The book is published by the High-Ventil Heater and Heat Reflecting Company, No. 15-25 Whitehall street, New York, and we give illustrations from it representing the apparatus in use and the principles of its operation. In places where this apparatus has been used during the last three winters it has superseded the use of heated air as a means of warming a floor or the matter contained in a room.



NEW HEATING SYSTEM—ELEVATED COAL GRATE, RADIATING COVER AND VENTILATING FLUE.

The parlor heater shown in the illustration consists of a suspended reflecting bell, in the top of which is a foul air flue ventilator, under the mouth of which is a reflecting cone, while under the cone is a red hot heater, radiating heat rays against the cone and reflector sides. There is no direct radiation downward, only reflected heat reaching the floor. The other picture represents a more simple arrangement of the apparatus, in which an elevating coal grate, adjustable to the desired height, is supplied with radiating cover and smoke pipe fitting into the pipe flue.

The great stumbling block heretofore has been, according to the advocates of the new system, in the apparent inability of the mechanical heating experts to conceive of any other agent in nature than air to be utilized for heating the floors of rooms and the people in them. They have thus selected one of the most uncontrollable agencies for the accomplishment of the ends desired, and proof is given that it is practically impossible to warm the lower part of a room by heated air without superheating the upper parts or to provide ventilation by that method. The continued effort to heat floors with air is therefore claimed to be the fundamental error of every system which employs devices for heating air and applying that medium for heating rooms and people; and the chief cause also of the universal failure to ventilate without machine blowers.



THE NORMAL REFLECTION OF HEAT RAYS.

The new system applies rays of heat, instead of air that is warmed, and not less radical is the new system of producing direct automatic ventilation by superheating air in small compass at a heater in a reflector at a high flue, where the deteriorated air is prevented from coming down into the room, but passes from the heater into the foul air flue.

The combinations of the several inventions are named the High-Ventil Heater and Heat Reflector. It is stated that for twenty years past every imaginable device was tried for automatic ventilation, with failure, until success was assured by placing the heater at a high flue and in a somewhat trumpet-shaped funnel, which was soon improved to hold the superheated air to the flue opening, and also to be a perfect reflector of the heat, spreading it downwards. The devices of the new system are practically constructed on strictly scientific lines, and their combined action shows an efficiency heretofore deemed impossible. Of all the heat generated by the heater in its elevated position, inclosed apart from any wall, and in a polished reflector which surrounds it on every side except the outlet for the heat rays from its front, there is claimed to be an actual efficiency of 80 per cent. applied to heating a room, of which about 70 per cent. is impacted into the floor and the substances thereon. Thus, in abolishing superheated air, there remains the continued effect of the gentle bombardment of rays of heat on the floor, which steadily warms the air which touches it; this air being lighter, rises slowly into the upper cool air and spreads, still leaving the temperature of the air at the floor many degrees warmer than that at a height of eight feet.

There cannot be any current of cold air along the floor, as the only current bears along overhead into the reflector, through the flue, where a partial vacuum is caused by the deteriorated air passing from the heater up the flue. This new system has been in use, having been substituted for air heaters, in many places in various circumstances, and is practicable in any conditions where waves of heat can be spread downwards from the centre of a ceiling; from any wall-flue at any elevation, or from the corner of any room, without regard to the height of the ceiling. It will heat the floor of a veranda out of doors in winter. Although extremely economical, efficiency appears in its work with moderate heat radiation where wire gauze is made slightly incandescent, yet its more economical effect appears with higher temperatures of incandescent heat, radiating against the reflector.

The Fireside Touchstone.

Who is there that does not delight in having comfortable subjects for contemplation and for profitable thought when at the family fireside, after the principal labors of the day are over? Or, who, not having such a home resort, does not frequently entertain pleasant thoughts as to the time when the fullness of living will thus be rounded out to him or her? We all want homes, more or less completely planned and with varying degrees of elegance in their finish and adornment, but we want such homes for our own, and in permanence. And, therefore, to all, whether the problem is to acquire a new home, or to render more perfect the comfort and refinement of the old one, the Building Edition of the SCIENTIFIC AMERICAN cannot fail to be a most welcome visitor to every fireside. It has beautiful engravings and plans, with descriptions of houses and their furnishings, to suit all tastes, from those who mean to thus expend only a few hundred dollars, up to those who desire the most costly mansions. And it is a most healthful pleasure, as it cannot fail to be profitable to make the matter furnished in its handsomely printed pages a frequent topic in the family circle, to the end that more families may have homes, and the best homes possible, taking into consideration their situation and environment. Many thousands of people have already, in the ten years during which the special Building Edition has been published, availed themselves of the plans thus furnished, and the attractive features and modern improvements presented, for the building and adornment of their homes, and the number is constantly on the increase, for each number of the paper is in most cases carefully preserved, on account of the many beautiful plates regularly presented, and which are nowhere else to be found. To all our old subscribers, therefore, we beg to suggest that, in renewing their annual subscriptions, many of which fall due about this season, they will also persuade some friend or neighbor to send in a subscription. The paper is sent for a year for $2.50, and at the end of that time, with the use of a binder or at a little expense for binding, one is in possession of a handsome, large, richly illustrated volume, constituting a better investment than most expenditures for bound books.

ANNUNCIATOR TO USE WITH BURGLAR ALARMS, ETC.

The illustration herewith represents an annunciator designed for use in dwellings, in connection with burglar alarms, to indicate just where an entrance is being effected. An apparatus of this kind is inexpensive, and commends itself for use in every out-of-town dwelling where insufficient police protection offers such favorable working grounds for thieves and burglars. The

BURGLAR ALARM ANNUNCIATOR.

New York Electrical Supply Company, 152 Front street, New York, is prepared to furnish estimates on the above apparatus complete, also on bells, batteries, telephones and all other electrical instruments and supplies, and, when requested, plans, instructions and methods of connecting any outfit will be furnished, so that any unskilled person may do the work.

MESSRS BERGER BROS., of Philadelphia, recently built a three-story factory at Germantown Junction, Philadelphia, put in the necessary machinery, and are at present making pipe and gutters of all kinds and sizes. The plant has been running smoothly and successfully for several months.

NEW HEATING AND VENTILATING SYSTEM—GAS HEATER IN SUSPENDED REFLECTING BELL CONNECTED WITH VENTILATING FLUE.

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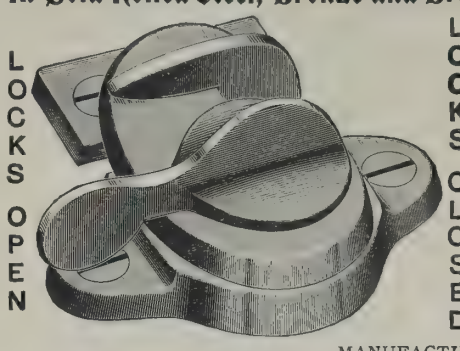

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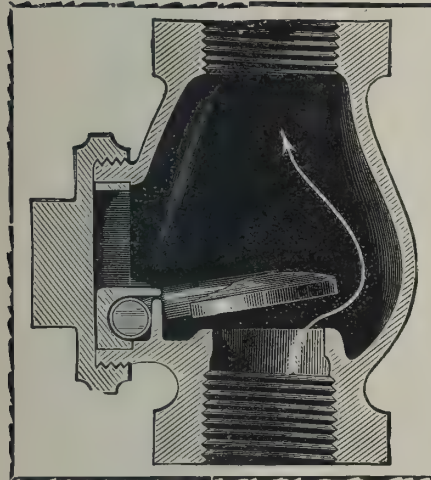

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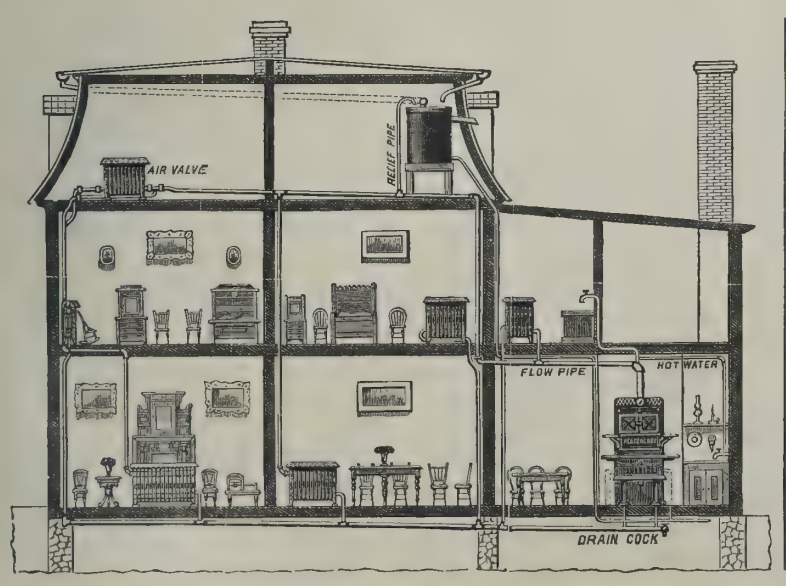

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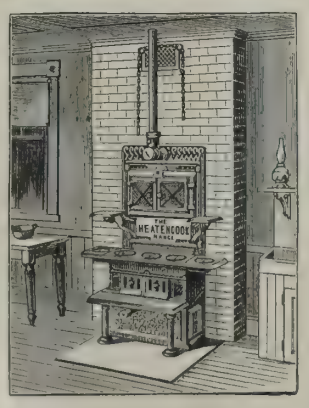

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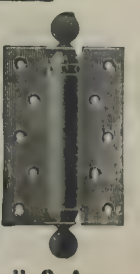

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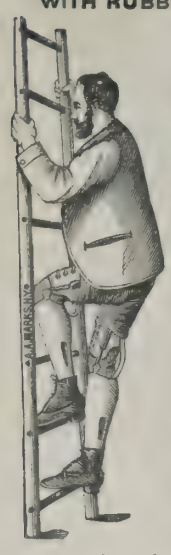

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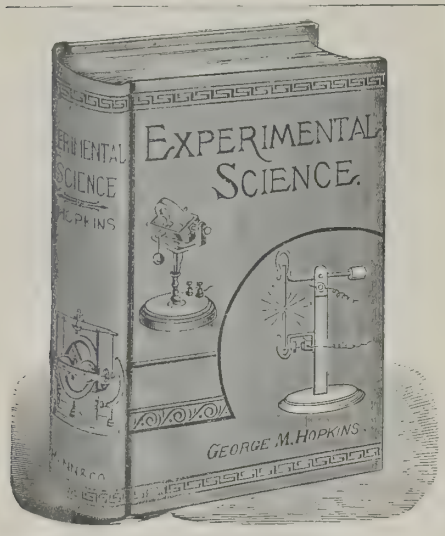

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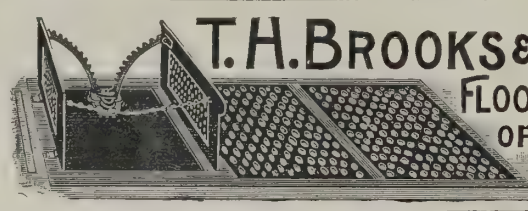

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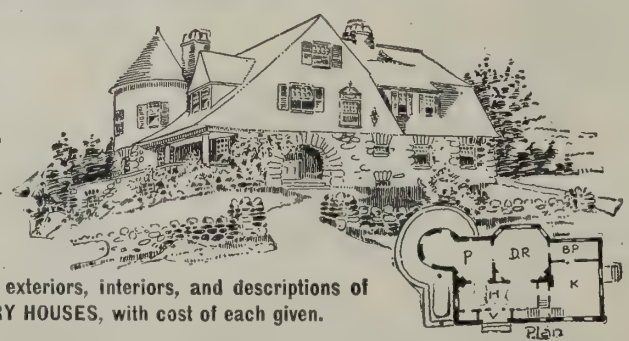

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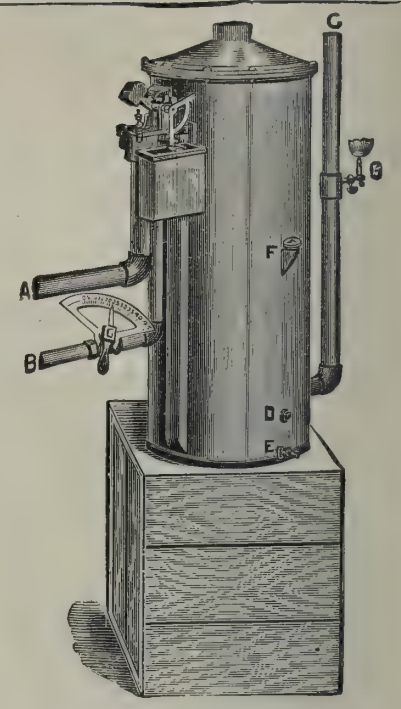

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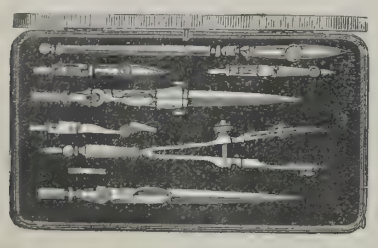

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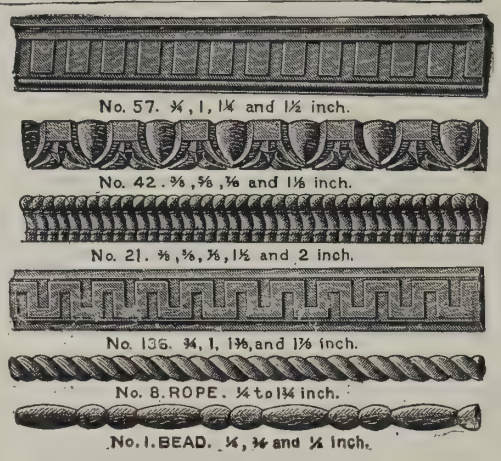
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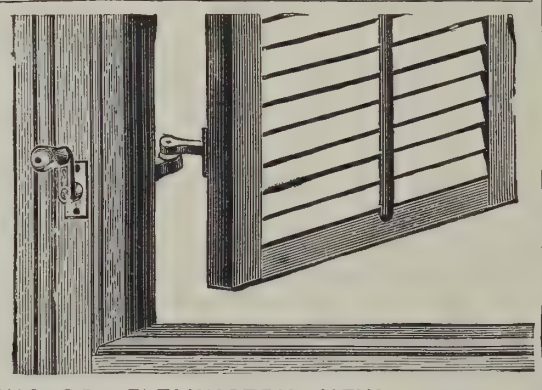

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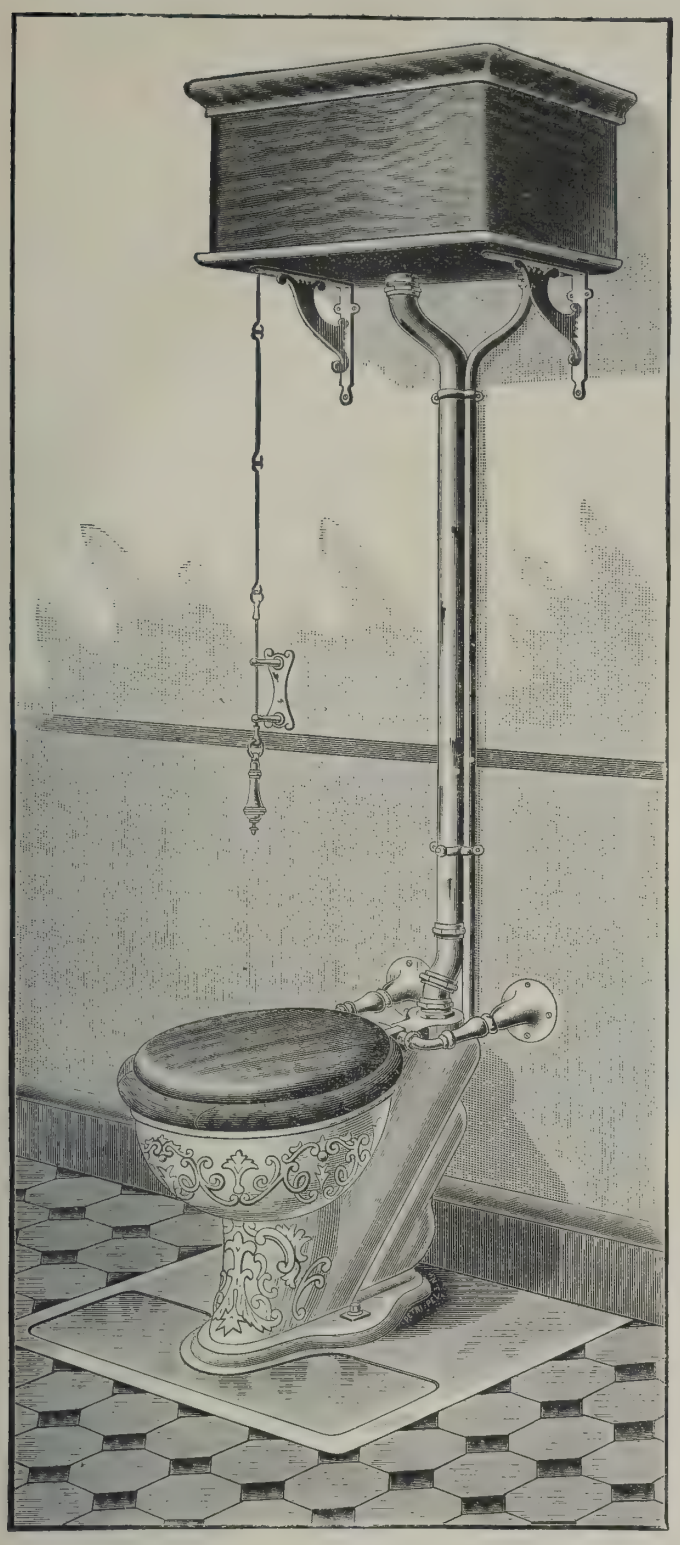

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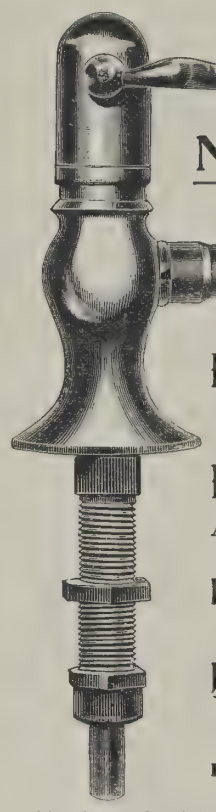

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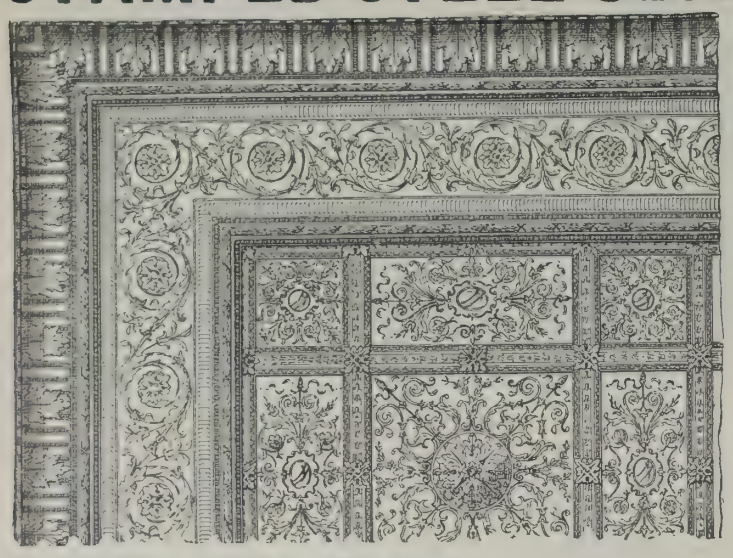

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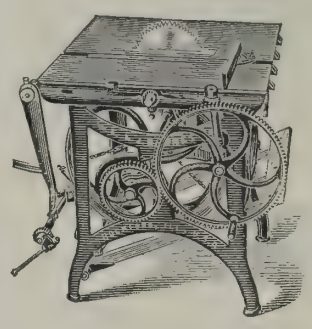

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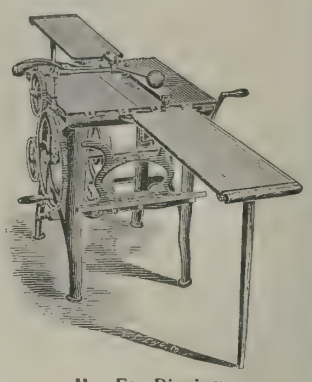

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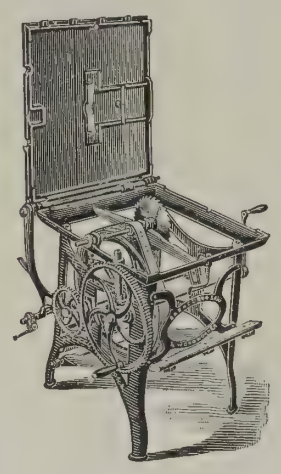

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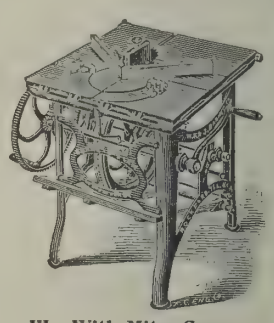

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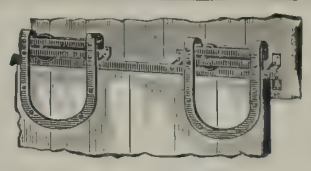

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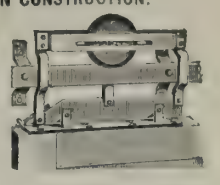

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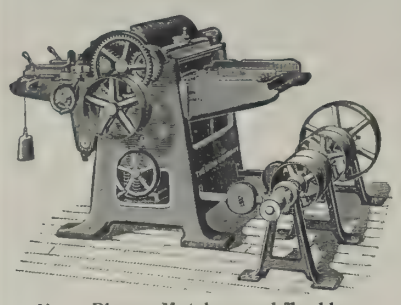

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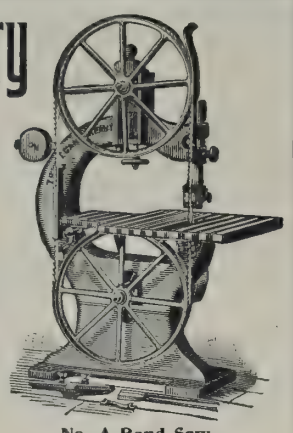

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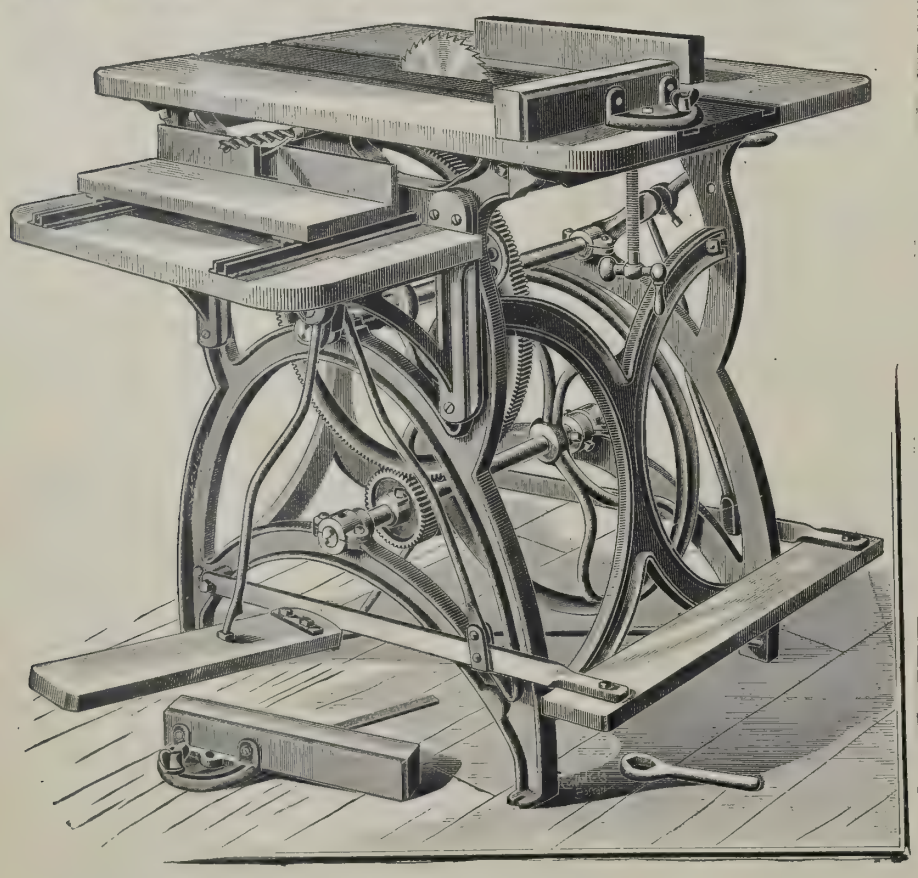

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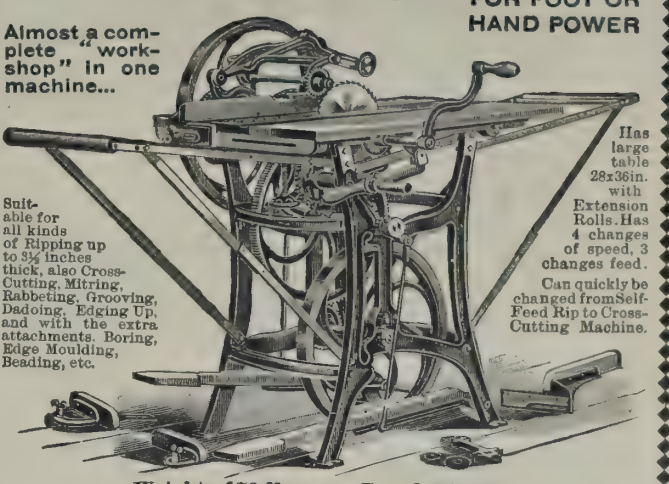
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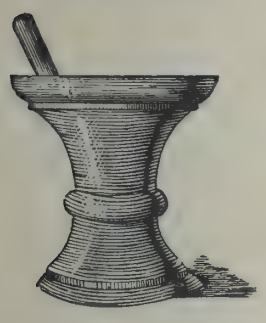

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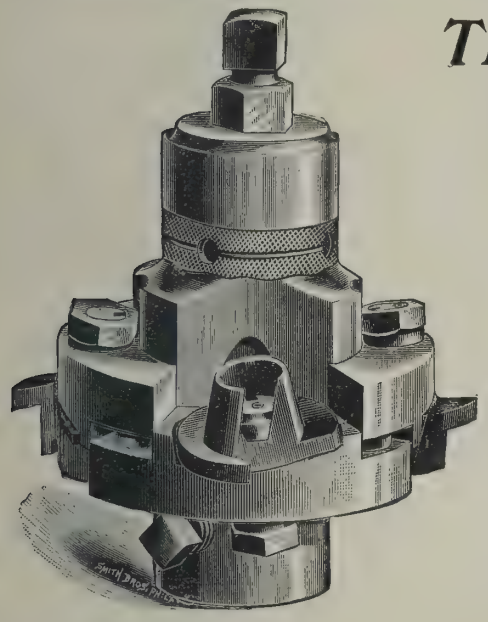

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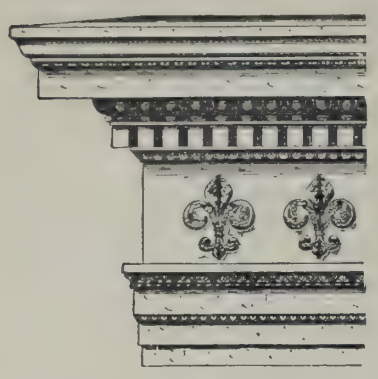

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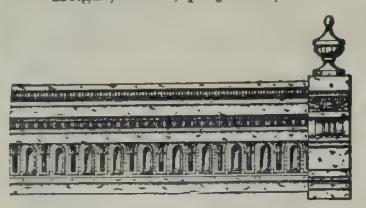

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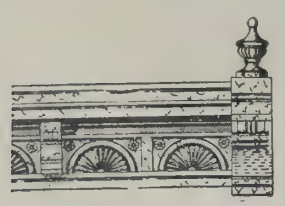

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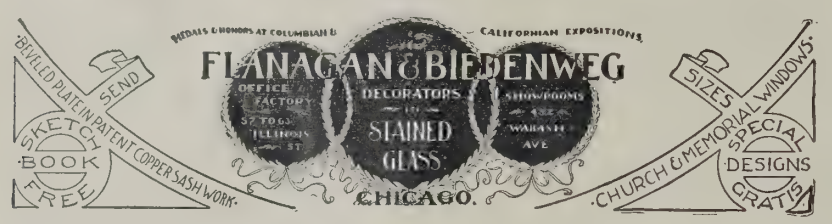
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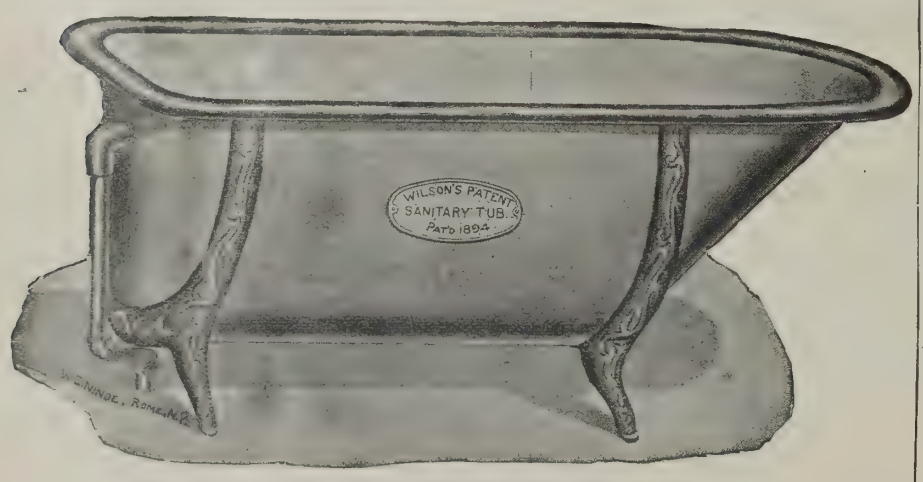

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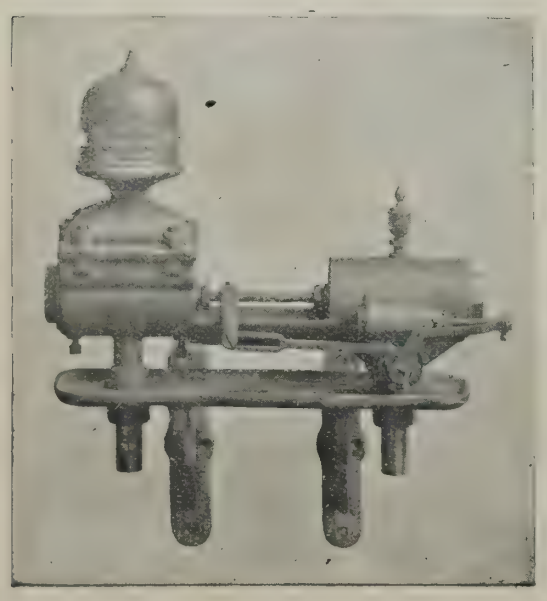

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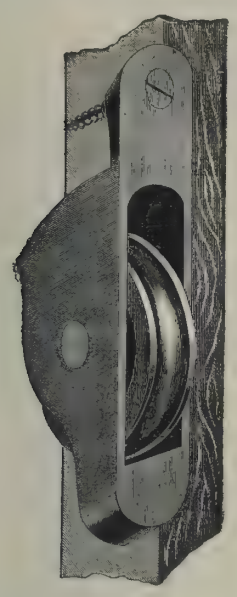

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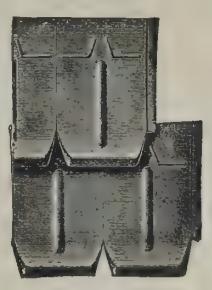

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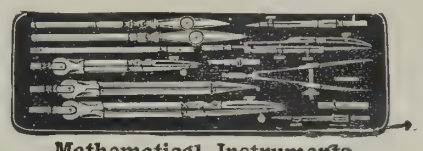

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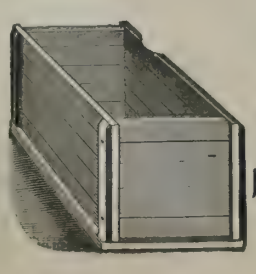

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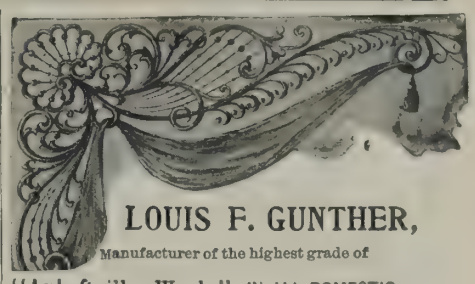

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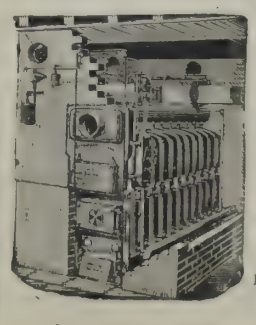

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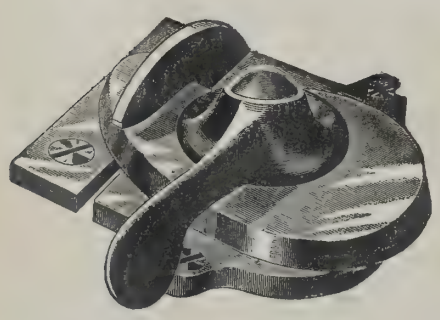

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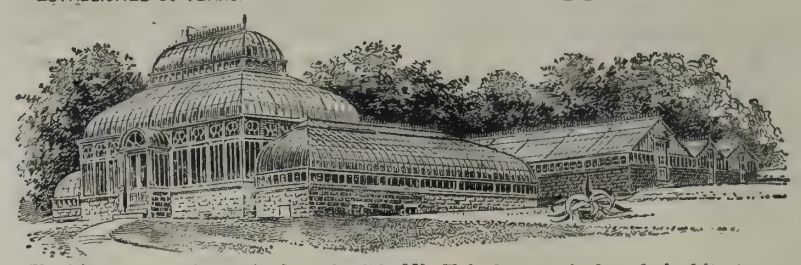

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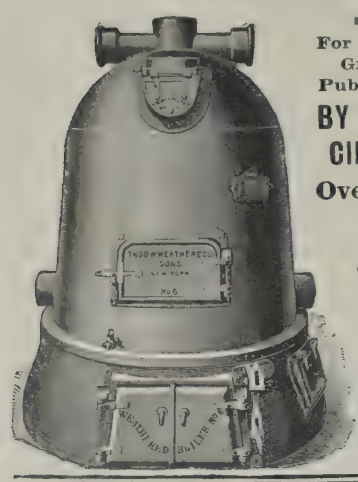

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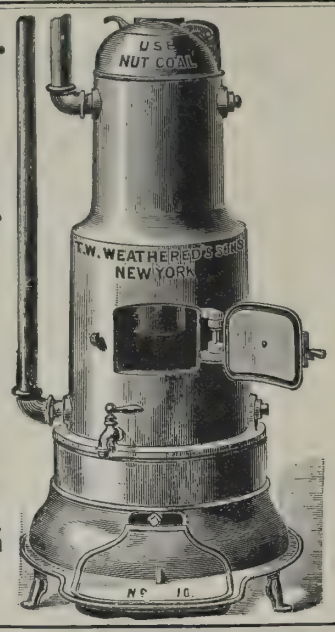

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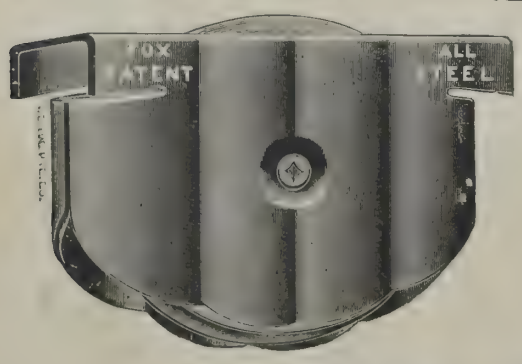

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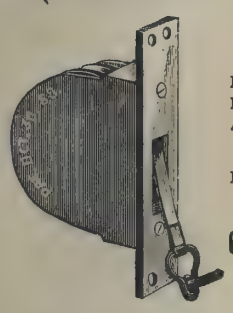

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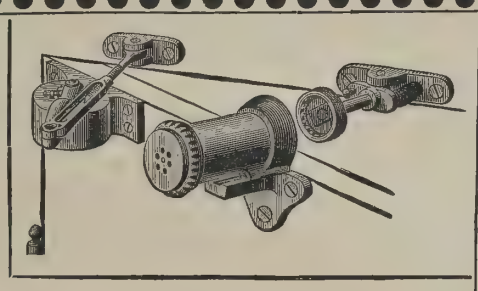

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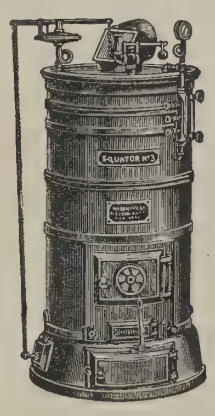

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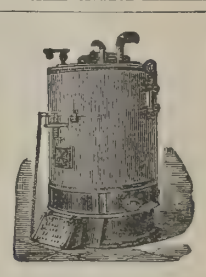

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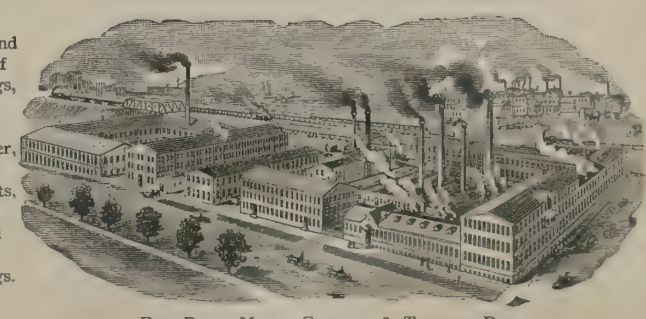

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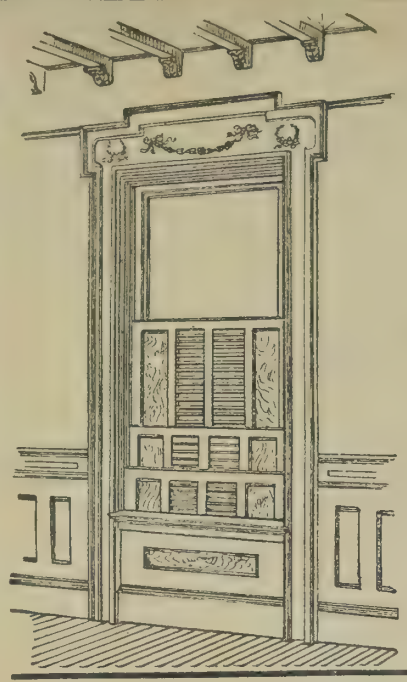

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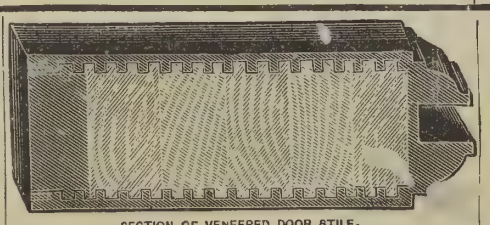

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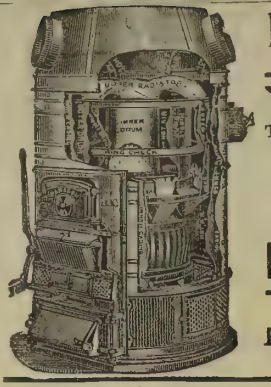

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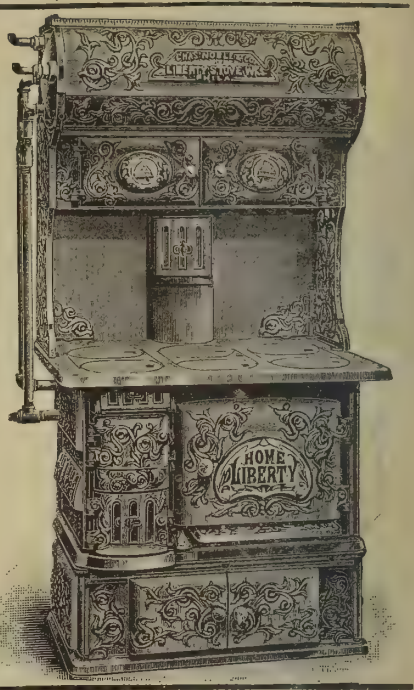

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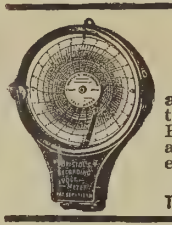

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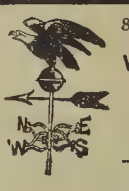

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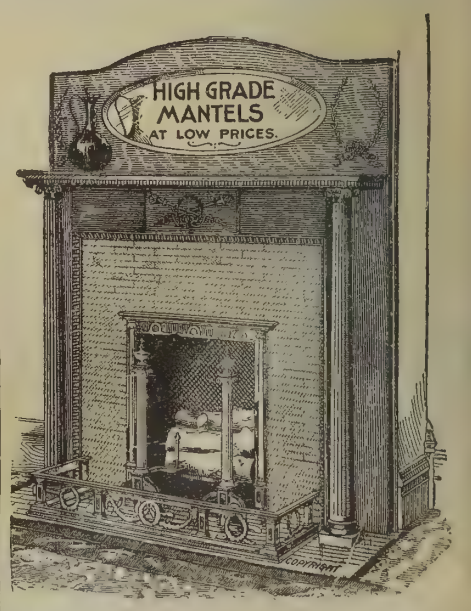

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